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THE RATE OF INTEREST
IN A PROGRESSIVE STATE



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THE
RATE OF INTEREST
IN A PROGRESSIVE STATE

BY

J. E. MEADE

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TO
E. M. M.

PREFACE

THIS book is of a purely introductory nature, both because its arguments are constructed on very simple assumptions, and because it deals only with the conditions of dynamic equilibrium as a necessary preliminary to a study of disequilibrium. Moreover, I am sure that within these very narrow limits it is still very incomplete and probably also in places positively incorrect. I would, however, defend myself for publishing such a book in such a state, both because I am convinced that economists must make a much more intensive study of the monetary conditions of dynamic equilibrium before the theory of trade fluctuations and disequilibrium can be much further advanced, and also because it is in my view justifiable, and indeed desirable, that economists should publish their thoughts on a problem on which a great number of other economists are working, even if their work is admittedly very incomplete; for advance can most efficiently and quickly be made by such sharing of ideas and by co-operative work.

It will be clear to anyone who reads this book how much is due to Mr. J. M. Keynes' recent work on monetary theory, and to the work of Mr. D. H. Robertson, under whose guidance I worked for a year on monetary problems. Dr. Hayek's book *Prices and Production* has also suggested many very important ideas and problems to my mind, though I believe that there is still no argument in that

book which I can both understand and accept. It will be less clear to my readers how much I owe to Mr. R. F. Kahn and Mr. W. M. Allen, with both of whom I have spent many hours arguing about these problems, and who have thus given me so much help in every problem, that I cannot adequately express my thanks. I am afraid that it has been impossible for me to acknowledge in the text every point that they have suggested to me, because I always find it impossible to remember where I first came across any particular idea. I hope, therefore, that they—and indeed anyone else whom I have treated in a similar way—will forgive me if they see ideas of their own expressed in this book without acknowledgement. This is, I think, an inevitable consequence of working with other persons on a particular problem.

J. E. MEADE

HERTFORD COLLEGE, OXFORD
January 1933

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I

ASSUMPTIONS AND DEFINITIONS

THE object of this enquiry is to discuss the effects of changes in the economic situation in a progressive society upon the equilibrium rate of interest. I shall, however, practically confine myself to a discussion of the questions: What can be meant by an equilibrium rate of interest? What changes in this equilibrium rate are to be expected in a progressive society? and In what conditions will the market rate of interest move so as to conform with the equilibrium rate? That is to say, there is a further large field of enquiry which is of the utmost practical importance but to which this work is purely introductory, namely, the discussion of the economic consequences which will follow a discrepancy between the actual market rate of interest and the equilibrium rate.

By a progressive society I mean one in which output per head is increasing. This increase may be due to one or any combination of three causes: (i) to inventions, under which head is included any newly discovered change in methods which would cause an increased output without a change in the factors employed; or (ii) to the use of a greater proportion of the other factors of production to labour, a phenomenon of a state in which either the population is diminishing or capital is being accumulated at a greater rate than the population

is increasing; or (iii) to "increasing returns" caused by an absolute increase in output, which may make feasible new methods of production not included under (i).

For the purposes of simplification I intend to make certain very important assumptions concerning the progressive society which is being studied. I fully realise that these assumptions are of great practical importance; and for this reason, as well as for the reason that the questions which this enquiry attempts to answer are severely limited, this work is of a purely introductory character.¹ At the same time it is hoped that the discussion of the problem on the following simplifying assumptions will isolate and clarify certain causal relations of fundamental importance in any study of trade fluctuations, and thus provide a useful introduction to a more complete study of the problems.

The assumptions on which I am working are the following:

- (i) It is assumed that the progressive society which is being studied has one uniform monetary unit and a centralised banking system, and that there is the possibility, over a period of time of a certain length, of mobility of labour and capital within it; *i.e.* it is assumed to be a "closed" system and to have no economic relations at all with the rest of the world.

¹ Above all I hope that no one will read what is said in the following pages as if they contained practical proposals. I may state definitely at this point that I should not in fact advocate what I have called a neutral money policy, which clearly to be successful demands a very large measure of *laissez-faire* throughout the economic system.

(ii) Except where it is stated to the contrary, it is assumed that there is perfect competition between producers in the industrial system; or in other words, that no producer produces a large enough proportion of the total output and that there does not exist sufficient preference on the part of buyers for the output of a single producer, for the single producer to take into account the effect which an alteration in his output would have on the price of his product. It is in fact impossible to assume that this is the case in every industry, when one is dealing with increases in output per head due to "increasing returns" of the type mentioned above (p. 2); for the type of increase in output per head mentioned there depends upon the growth of total output to a size at which it pays to introduce a single instance of a certain method of production to deal with the total output, *i.e.* depends upon the existence of monopolistic conditions. I shall not always assume that competition is perfect, but it is always assumed that over by far the greater part of the industrial system there is a large measure of competition.

(iii) The third assumption is that the population in the society is constant. This assumption is made merely in order to make possible a simple and straightforward measure of a neutral money system and the equilibrium rate of interest, the definitions of which are much more complicated in the case of a growing or diminishing population (cf. p. 23). This assumption, while it makes the work incomplete, allows a very much simplified discussion of the effects of inventions and capital accumulation

on the equilibrium rate of interest. At the same time it is still possible to discuss the effects which an absolute increase in output may have upon output per head and the rate of interest by making different methods of production possible; for an absolute increase in output will be caused by an increased capital equipment, even if the population is constant.

(iv) In order to discuss what action the banking system must take in order to maintain equilibrium, it is necessary to assume that the banking system is under no legal restrictions; and in order to present merely the main features of a centralised banking system, I shall make simplifying assumptions concerning it. It is assumed that there is a centralised banking system, and that the only form of money used is the deposit liabilities of the banks,¹ upon all or part of which they pay a rate of interest. The assets of the banks are composed of long-term securities, either government stock or industrial debentures, and short-term securities, either government short-term debt or bills or securities, by which it makes short-term advances to others. That is to say, it is assumed that all advances are made in the form of the purchase of the short-term securities or bills of its customers. In this simplified banking system we have only three rates of interest to consider, namely, the deposit rate, the long-term rate and the bill rate, and at the same time any increase or decrease in the amount of money over any period

¹ Or, alternatively, that "money" takes the form of notes issued by the banks and their deposit liabilities, but that the banks make no distinction in their liabilities between deposits and notes.

of time is equal to the net purchase or sale of securities by the banks, the repayment of a customer's short-term borrowing taking the form of the repurchase by him of short-term securities issued by himself.

In the following pages I shall use the terms "Final Incomes" and "Individuals' Incomes". Final Incomes in any period of time are defined as the value of the output of the community in that period. Thus Final Incomes in any period = the expenditure on consumption goods in that period — allowance which must be made for depreciation of capital used in consumption industry in that period + total expenditure on capital goods or intermediate products — allowance which must be made for depreciation of capital goods used in the production of intermediate products. In the simple case, in which all capital which depreciates in any period is replaced in the same period, this is equivalent to expenditure on consumption goods in that period (which I shall call Expenditure) + expenditure on additions to capital in that period (which I shall call Net Investment). But it is not in fact always the case that capital goods are capable of being replaced in the period in which an allowance for their depreciation has to be made. In the case of fixed plant and machinery, which lasts a certain term of years and must then be replaced, an allowance for its depreciation must be made from the sale of its product in the early years of its life, even if it is physically impossible to replace it for a long period of time. Moreover, in any study of trade fluctuations this consideration is important; for in a boom

a great deal of fixed capital may be constructed which will last in much the same condition for some years, and of which a significant amount may then need to be replaced at about the same time.

I shall therefore divide the allowance which must be made for depreciation into two parts: namely, (1) that amount of money which must be spent in any period actually to replace fixed or working capital which has been worn out in that period and which needs to be replaced at the end of it—this I shall call allowance for replaceable depreciation of the period; and (2) that money allowance which should be made¹ in any period for depreciation due to the production of that period, but which cannot be spent upon replacement until a future date—this I shall call allowance for non-replaceable depreciation of the period. Further, it is necessary to divide the cost of replacing capital in any period into two parts: namely, (1) that amount of money which would have to be spent on replacing capital the depreciation of which is due to the period in question—this may be called the replacement cost of the period's depreciation; and (2) that amount of money that must be spent in any period in main-

¹ There are certain difficulties connected with this idea. For the allowance which should be made for depreciation will depend upon the price of capital goods at the future time at which replacement must take place, and also to a certain extent upon the future course of the rate of interest, since the higher the rate, the smaller the amount which must be laid aside at any moment to accumulate for purposes of replacement. By the allowance for non-replaceable depreciation I certainly do not mean what those in control of the business actually allow, nor that which the future teaches they should have allowed, but rather what the "market" considers they ought to allow. For it is this which is relevant for the determination of the market value of a concern's capital equipment.

taining capital the depreciation of which is due to the non-replaceable depreciation of previous periods —this may be called the replacement cost of previous periods' depreciation. The allowance for the replaceable depreciation of the period is by definition the same as the replacement cost of the period's depreciation.

Now Final Incomes = Expenditure + expenditure on intermediate products — depreciation allowance of the period. The allowance for depreciation of the period = allowance for replaceable depreciation of the period + allowance for non-replaceable depreciation of the period = allowance for non-replaceable depreciation of the period + replacement cost of the period's depreciation = allowance for non-replaceable depreciation of the period + replacement cost of capital — replacement cost of previous periods' depreciation. Therefore Final Incomes = Expenditure + expenditure on intermediate products — replacement cost of capital — allowance for non-replaceable depreciation of the period + replacement cost of previous periods' depreciation = Expenditure + Net Investment¹ — allowance for non-replaceable depreciation of the period + replacement cost of previous periods' depreciation. Thus in any period in which non-replaceable depreciation > replacement cost of previous periods' depreciation, Final Incomes will be < Expenditure + Net Investment; while in any period in which non-replaceable depreciation < replacement cost of previous periods'

¹ Net Investment = expenditure on additional capital goods = expenditure on intermediate products — replacement cost of capital.

depreciation, Final Incomes will be $>$ Expenditure + Net Investment. Net Investment + replacement cost of previous periods' depreciation — allowance for non-replaceable depreciation I shall call Investment, so that Final Incomes = Expenditure + Investment.

Individuals' Incomes are defined as the total amount of money received by individuals in a period of time apart from what is received by the sale of personally owned capital, by borrowing or by personal gift, minus any money paid in taxes. The term includes therefore all salaries, wages, rents, dividends and interest on debt received by individuals together with all relief payments or pensions, paid by public authorities not in return for any service rendered, *i.e.* not already included in salaries, wages, etc., minus taxes paid by individuals. Savings in any period of time are defined as Individuals' Incomes minus Expenditure in that period.

The Budget Deficit I define as the total amount borrowed by public authorities + the decrease in their holdings of money or securities — Net Investment undertaken by them; that is to say, the Budget Deficit is equal to the net borrowing of public authorities for purposes other than capital development. Similarly the term Decrease in Companies' Reserves I shall use to mean all borrowing by companies + the decrease in their reserves of money or securities — their expenditure on Net Investment in any period; that is to say, this term includes all net borrowing by companies for purposes other than capital development.

Now the total increase in the amount of money

in any period of time must be equal to the increase in the amount held by individuals — decrease in the amount held by companies or public authorities, and this must be equal also (*v. above, p. 4*) to the amount of securities bought by the banks in the same period. The net amount of securities bought by individuals in any period must equal Savings — increase in the amount of money held by individuals — Net Investment undertaken by individuals. The net amount of securities sold by public authorities must equal the Budget Deficit + Net Investment undertaken by public authorities — decrease in amount of money held by public authorities. The net amount of securities sold by companies must equal the Decrease in Companies' Reserves + Net Investment undertaken by companies — decrease in the amount of money held by companies. The total amount of securities bought in any period of time must of course equal the total amount sold in the same period. Thus the net amount bought by individuals and by the banks = the net amount sold by public authorities and by companies. It follows that the total increase in the amount of money + Savings — Net Investment by individuals — increase in the amount of money held by individuals = Budget Deficit + Decreases in Companies' Reserves + Net Investment undertaken by public authorities or companies — decrease in the amount of money held by public authorities or companies. But the total increase in the amount of money = the increase in the amount held by individuals — decrease in the amount held by public authorities or companies, and Net Investment = Net Investment undertaken by individuals, public

authorities or companies. Therefore $\text{Savings} = \text{Budget Deficit} + \text{Decrease in Companies' Reserves} + \text{Net Investment}$. That is to say, Savings may be utilised to finance the Budget Deficit or Decreases in Companies' Reserves, as well as to finance Net Investment; or Net Investment may be financed by the Budget Surplus or Increase in Companies' Reserves, as well as by Savings.

Since $\text{Savings} = \text{Individuals' Incomes} - \text{Expenditure}$, and $\text{Net Investment} = \text{Investment} - \text{replacement cost of previous periods' depreciation} + \text{allowance for non-replaceable depreciation of the period}$, it follows that $\text{Individuals' Incomes} + \text{Budget Surplus} + \text{Increases in Companies' Reserves} + \text{replacement cost of previous periods' depreciation} - \text{allowance for non-replaceable depreciation} = \text{Expenditure} + \text{Investment} = \text{Final Incomes}$.

II

A NEUTRAL MONEY SYSTEM

A NEUTRAL money system is one which simply interprets the decisions of individuals, of companies or of the government without, by its own action or inaction, making the effects of such decisions different from what they would have been in a non-monetary economy. A neutral money system is then, on the assumption of a constant population, one which maintains Final Incomes constant.¹ We shall see later how by lowering the rate of interest the banking system can increase and by raising the rate decrease Final Incomes; the equilibrium rate of interest, again on our assumption of a constant population, is defined as that rate which keeps Final Incomes constant.

In order to see the sense in which such a money system is defined as neutral and such a rate of interest as the equilibrium rate, it is best first to discuss the case in which both the replacement cost of previous periods' depreciation and also the allowance for non-replaceable depreciation are nil, *i.e.* the case in which it is possible actually to replace capital goods, as the money allowance for their depreciation must be made. In this case Final Incomes = Expenditure + Net Investment. The discussion of the situation, in which

¹ With the unimportant exception discussed in the footnote on page 16.

this assumption is no longer made, is reserved till later.

Now there are decisions, which may be taken in many forms in the economy, that so much less shall be spent per period of time on consumption goods. The money system will in this case only interpret this decision, if it brings it about either that so much more is spent on additional capital,—for this is what is implied in the decision to spend less on consumption,—or that there is a simultaneous accompanying increase in the amount which other persons decide to spend on consumption goods, caused, *e.g.*, by a fall in the rate of interest. A decision that less shall be spent on consumption goods may be taken in any of the following forms: (i) individuals may decide to save so much more per period of time from their incomes; (ii) companies may decide to increase their reserves and so to distribute so much less in dividends, thus inducing individuals to spend less on consumption goods; (iii) public authorities may decide to increase their tax revenue, which decision may lead to a decision on the part of individuals to spend less on consumption goods, either because of the direct decrease in their incomes or because of the indirect decrease in their incomes, due to direct taxation of companies' profits and so to smaller dividend payments; (iv) the payments which public authorities have to make, *e.g.*, as interest on debt, may fall, and the decrease in their payment of interest might lead to a decision on the part of individuals to spend less on consumption goods. But, whichever of these forms the decision may take, it is clear that the intention of the economy is that so much less should be spent

on consumption goods, in order that exactly so much money may be released to finance an increase in Net Investment. The money system will only remain neutral in so far as this is actually the case, or in so far as an alteration in the rate of interest induces people to spend more on consumption again.

Similarly any decision on the part of the economy that more shall be spent on consumption goods is synonymous with a decision that exactly so much less shall be spent per period on Net Investment. Such an intention may be (i) a decision on the part of individuals to save less of their incomes; (ii) a decision on the part of companies to put less money to reserve and to increase their dividend or wage payments, thus causing indirectly a decision on the part of individuals to spend more on consumption goods; (iii) a decision on the part of public authorities to reduce their tax revenue, this leading directly or indirectly to a decision on the part of individuals to spend more on consumption goods; (iv) the necessity on the part of public authorities to pay, *e.g.*, an increased amount of interest on a growing debt, this leading to an increased expenditure by individuals on consumption goods. The intention of all these decisions is clearly that so much less money should be forthcoming per period of time to finance Net Investment, in order that so much more should be forthcoming to be spent on consumption goods; and the money system will only remain neutral if there actually is such a decrease in Net Investment, or if a rise in the rate of interest induces people to spend less again on consumption goods.

Again, a decision may be taken that more (or less) should be spent on Net Investment. Such a decision clearly implies that less (or more) shall be spent on consumption goods, or that less (or more) shall be spent on Net Investment in other directions, in order that funds may be released to finance the increase (or absorbed to counterbalance the decrease) in Net Investment. Such a decision may take any one of the following forms: (i) individuals may decide to increase (or decrease) the amount spent on additional capital equipment per period, and may for this purpose borrow more (or less) or lend less (or more) or cut down (or increase) their expenditure on consumption goods; (ii) companies may make the same decision, and may for this purpose borrow more (or less) or cut down (or increase) their dividend or wage payments or decrease (or increase) the rate at which they are adding to their reserves; (iii) public authorities may make such a decision, and may borrow more (or less), increase (or decrease) their tax revenue or decrease (or increase) their other expenditure to do so. But the decision to spend more (or less) on additional capital clearly implies that someone else should be induced either to save more (or less), *i.e.* to spend so much less (or more) on consumption goods, or to invest less (or more). Only if this is effected by appropriate changes in the rate of interest, or by other means, will the money system interpret the decision accurately and so remain "neutral".

Since then a neutral money system, in the case in which the replacement cost of previous periods' depreciation and the allowance for non-replaceable depreciation are nil, implies that any change in Net

Investment should always accompany and be accompanied by an exactly equivalent change in the opposite direction in Expenditure, and since in this case Final Incomes = Net Investment + Expenditure, a neutral money system is one which keeps Final Incomes constant. But we must now consider the case in which Final Incomes = Investment + Expenditure, and in which there are changes in Investment due to changes in the replacement cost of previous periods' depreciation and in the allowance to be made for non-replaceable depreciation. Suppose that for a period of time the replacement cost of previous periods' depreciation is nil, because all fixed capital in use is newly constructed, and that this is followed by a period in which this term becomes positive, because the time has come in which much fixed capital is worn out; then, if there is no conscious decision, caused, *e.g.*, by a rise in the rate of interest, to decrease Expenditure and so to release funds and thus factors of production from making consumption goods, the total output of and expenditure on capital goods should remain the same; this implies that Net Investment should fall as the replacement cost of previous periods' depreciation rises, if the money system remains "neutral" and simply interprets the decisions of the economy. Thus an increase in the replacement cost of previous periods' depreciation must be accompanied by a decrease in Expenditure or in Net Investment; and conversely, a decrease in this term must be accompanied in a neutral money system by an increase in Expenditure or in Net Investment.¹ Thus, since

¹ It is logically permissible in this discussion to neglect conscious decisions taken in any period to vary either the replace-

Final Incomes = Expenditure + Net Investment
 + replacement cost of previous periods' depreciation – allowance for non-replaceable depreciation,
 Final Incomes must remain constant so far as variations in the replacement cost of previous periods' depreciation are concerned.

Suppose now that a period of time arrived when for one reason or another there was a sudden decrease in the amount of fixed capital which needed to be replaced, so that there was an increase in the allowance to be made for non-replaceable depreciation.¹ Funds and factors of production, which were being expended on replacing capital goods, would now be released, and, even though the total depreciation allowance to be made per period were not reduced, yet in the nature of things these funds cannot at the moment be used to make good this depreciation. The economy to remain in equilibrium must decide to use these funds for the time being to increase the output of consumption goods or of

ment cost of previous periods' depreciation or the allowance for non-replaceable depreciation, since neither of these things is capable of such variation; both depend upon what has in fact been done in the past.

¹ This constitutes the most important reason for variations in the allowance for non-replaceable depreciation; that is to say, usually when there is an increase (or decrease) in the allowance for non-replaceable depreciation, there will be an equivalent decrease (or increase) in the replacement cost of depreciation due to the period's output. It is possible, however, that the allowance for non-replaceable depreciation should suddenly decrease (or increase) simply because the fixed capital began to last for a longer (or shorter) time, which would not cause any corresponding increase (or decrease) in the replacement cost of the period's depreciation. In this case with a neutral system Final Incomes should rise (or fall) by the amount of the fall (or rise) in the allowance for non-replaceable depreciation, since there is no simultaneous increase (or decrease) in the demand for funds for the replacement of the period's depreciation.

new capital goods. This can only come about if there is a conscious decision on the part of the economy to spend exactly so much more on consumption goods or on Net Investment. Thus with a neutral money system an increase (or conversely a decrease) in the allowance to be made for non-replaceable depreciation must be accompanied by an increase (or conversely a decrease) in Expenditure or in Net Investment. We have therefore seen the reason why a neutral money system is one which maintains Final Incomes constant,¹ when Final Incomes are defined as Expenditure + Net Investment + replacement cost of previous periods' depreciation - allowance for non-replaceable depreciation.

At this point it may be useful to discuss the effects on prices of a neutral money system in a progressive economy such as we are assuming. A neutral money system in a progressive society, in which inventions are taking place and capital is being accumulated, will over a long enough period of time mean that the general price level of commodities will fall; for there will be an increase in the output of commodities due to inventions and a greater supply of capital per head of the constant population, while Final Incomes remain constant. Moreover, the output of final consumption commodities is likely to increase in the greatest proportion and so their price to fall in the greatest proportion, owing to the fact that they are the final product and are therefore more likely to feel the effects of an increase in the capitalistic methods of production.

¹ In what follows I shall disregard the exception mentioned in the footnote on the previous page.

But if there are, as is likely (*v.* Chapter IX), significant changes in the proportion of Final Incomes going to finance Investment and to finance Expenditure, prices will not necessarily fall in the short period. Thus if in the short period there is an increase in Expenditure and an equivalent decrease in Investment, the price of consumption goods will rise and that of capital goods fall, the extent of this rise and of this fall depending upon the short-period elasticities of supply of consumption goods and of capital goods respectively. Let us suppose that the short-period elasticity of supply of capital goods is small and that of consumption goods great; then an increase in Investment and an equivalent decrease in Expenditure will mean that the general price level will rise, since the rise in the price of capital goods will outweigh the fall in the price of consumption goods.¹ Conversely, if the short-period elasticity of supply of consumption goods was small and that of capital goods great, an increase in Expenditure together with an equivalent decrease in Investment would cause a short-period rise in the general price index. Thus even with a neutral money system, while prices over a long enough period would fall, there may be short-period rises and falls in general price

¹ In this case the proportionate increase in the price of capital goods will only be greater than the proportionate decrease in the price of consumption goods, if Investment is not much greater than Expenditure, since only on this condition would the same absolute increase in Investment as the absolute decrease in Expenditure mean that the proportionate increase in Investment was as great as the proportionate decrease in Expenditure. But the statement in the text stands, if the prices of capital goods and of consumption goods in the general price index are weighted according to the amount spent on investment and on consumption goods.

indices and in consumption price indices, if variations in Investment and Expenditure take place.

Nor does a neutral money system mean that money wage-rates would necessarily fall or rise. Since with a constant population a neutral money system demands that Final Incomes remain constant, the wage-rate will vary directly with the proportion of the Final Incomes which goes to labour. In the first place it is well known that inventions which are of a capital-saving nature will increase the proportion which goes to labour, while those which are of a labour-saving nature will decrease the share which goes to labour, so that for this reason the wage-rate of labour may vary. But in the second place, apart from the effect of inventions, the effects of capital accumulation are not certain. If an increase in capital means a large fall in the rate of interest, because the marginal productivity of capital falls rapidly, then the share of the constant final money incomes going to wages, and so the wage-rate, will rise; while if an increase in capital means a small fall in the rate of interest,¹ the share going to labour, and so the money wage-rate, will fall.²

NOTES TO CHAPTER II

I

Neutral Money in Dr. Hayek's "Prices and Production"

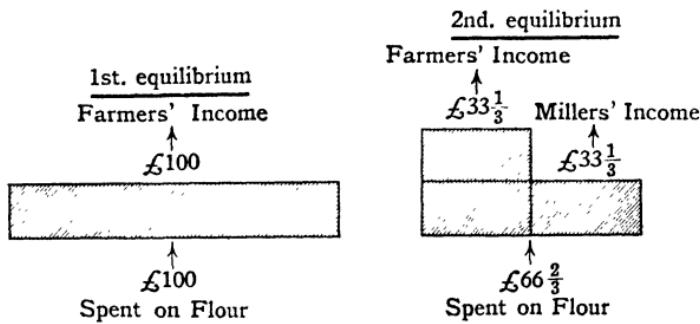
Dr. Hayek in his book *Prices and Production* has argued that in the process of capital accumulation Final Incomes

¹ *A fortiori* will it have this effect if it causes a rise in the rate of interest, which, as will be shown in Chapter IX, is quite possible.

² Since writing this I have read Mr. J. R. Hicks' *Theory of Wages*, and find that he has presented the same argument (*op. cit.* pp. 134-135).

will fall if the money system remains neutral.¹ In this note I shall attempt, by using an arithmetical example of the type which Dr. Hayek employs, to show why I consider this view to be incorrect.

Let us suppose that there is only one stage in the process of producing flour. "Farmers"—who include all labourers, entrepreneurs and landlords—produce flour with £100 in each period of time, which they purchase themselves for £100. At this point they undertake voluntary saving so that a process of milling, which takes the same time as the old single process, is introduced between the production of wheat and its consumption; and in the new equilibrium, in which again no saving is being undertaken, half the income goes to "farmers" and half to "millers", income including wages, profits, rent and payment of interest on capital. Now according to Dr. Hayek's theory, Final Incomes must fall from £100 to £66 $\frac{2}{3}$ if the money system remains neutral. Diagrams constructed on the principles of those employed in *Prices and Production* would show this in this manner:



Only if the change took this form would the effective circulation of money per period of time remain £100.

But this fall in Final Incomes must mean that some-

¹ Although the diagrams in his book do not include interest payments, I imagine that this is true, since he asserts that the amount of money \times its velocity against all transactions must remain constant, and since he assumes that the process of capital accumulation always means the introduction of fresh stages of production of the same length of time.

one's decision to save has not been accompanied by a simultaneous investment of the same amount, but has simply led to a fall in someone else's income. Let us trace the transition in which everyone's decision to save is accompanied by simultaneous investment. In period 1 farmers decide to buy securities worth £50 and to spend £50 instead of £100 on flour, *i.e.* they decide to save £50. Also in period 1 millers, who have floated the securities, spend £50 on wheat as investment in working capital to correspond to the £50 saving which has taken place in this period. Then in period 1 the incomes of farmers remain £100, since £50 are spent on their products for consumption, and £50 are spent on wheat for investment in working capital by millers. A decision to save £50 on the part of farmers has been accompanied by a simultaneous investment of £50, and final money income remains unaltered at £100. In period 2 no one decides to save any part of their income and no investment takes place. £100 are spent on flour ground by millers, who spend £50 in this period on wheat to replace their capital, and so have £50 as income for their milling. Farmers receive £50 for their wheat from the millers, so that final incomes remain $\text{£}50 + \text{£}50 = \text{£}100$. Expenditure on consumption goods as before the change again becomes £100, and a new equilibrium is reached. In every successive period farmers receive £50 income from millers for replacement of working capital, millers receive £100 for sale of their product and have therefore £50 income.

This can certainly only be brought about by either (1) an increase in transaction velocity of money, income velocity and the quantity of money having remained unchanged, or (2) by a constant transaction velocity, an increase in the amount of money and a fall in income velocity.

Let us now follow the transition in which incomes fall. In period 0 farmers have received £100 income and spent it all on wheat. In period 1 they *decide* to save £ $33\frac{1}{3}$; they spend £ $66\frac{2}{3}$ on wheat and £ $33\frac{1}{3}$ on securities. Millers float

securities worth £33½, but do not spend this till period 2 on wheat as investment in working capital. This £33½ received in period 1 by millers is not income to them. They have performed no function for it in period 1 but have simply exchanged securities for money. Investment in period 1 = 0; incomes = £66½ (the amount farmers receive), expenditure = £66½, so that savings, as I have defined that term, = 0. But the decision to save £33½ has led to a fall in incomes and a corresponding fall in savings of £33½. (To make this clear, suppose two farmers: farmer A and farmer B are each in period 0 getting £50 and spending £50. Suppose in period 1 farmer A decides to spend £50, i.e. not to save or dis-save, which he spends on farmer B's wheat in period 1. In period 1 farmer B decides to save £33½ and spends £16½ on farmer A's wheat. The millers receive the £33½ from farmer B but do not spend it in period 1 on wheat. The decision is to save £33½. This is accompanied by no investment. But farmer A, who spends £50 in period 1 and receives only £16½ in period 1, has been forced unwillingly to dis-save £33½, i.e. because there is no investment farmer B's saving £33½ has led to a decrease in farmer A's saving of £33½.)

In period 2 farmers who have had incomes of £66½ in period 1 decide again to save £33½, which they spend on securities issued by millers, and they spend £33½ on their own products for consumption. This day millers spend £33½ on wheat as investment in working capital. Incomes of farmers in period 2 are therefore £66½ (£33½ coming from millers and £33½ from themselves). In period 2, then, incomes are £66½ and they have spent £33½ so that their savings = £33½. Investment in period 2 = £33½ on working capital and incomes remain unchanged from period 1 to period 2.

In period 3—and *ad infinitum*—people decide to save nothing. £66½ is spent on flour bought from the millers. The millers spend £33½ on wheat to replace working capital, leaving them with incomes of £33½. In period 3 the farmers' incomes fall by £33½. They have spent £66½

on flour and have only received £33½, but millers have an income of £33½ in period 3, having had no income in period 2.

In period 4 farmers and millers decide to save nothing. Farmers spend £33½ and millers £33½ on flour—millers spending £33½ on wheat to replace working capital. The fall in incomes is due to the fact that millers have had to borrow money in period 1 in order to build up balances of money to hold against the new transactions. Unless, therefore, transaction velocities rise, or else there is an increase in the supply of money in period 1, a decision to save in period 1 will be accompanied by no investment in that period but by an enforced decrease in the savings of other people due to a fall in their incomes in that period.

II

The Assumption of a Constant Population

In this short note it is my intention to show by simple illustration why it is necessary to assume a constant population, in order that a neutral money system should be one which keeps Final Incomes constant, without discussing what should be the criterion of a neutral money system, when population is increasing or decreasing.

Let us imagine an economy in long-period static equilibrium with a constant population in which no saving and no investment is taking place. Let us suppose further that a new supply of labourers comes on to the market at an even rate¹ over a period of time equal to the period of production in the static equilibrium, and that these labourers are put to work to produce capital goods, so that after the lapse of a period of time equal to the period of production the capital supply will have increased in proportion to the increase in the supply of labour. In this simple case the output will have increased in proportion

¹ It is assumed that in the static equilibrium labour is the only original factor of production, and that units of labour are applied at an even rate over the period of production.

to the increase in the labour supply and the rate of interest will be unaltered.¹ Now if in this case every labourer decided to save his total income, including his wages and the interest on what he had saved, for a period of time equal to the difference between the total length of the period of production and the time that had elapsed between his entry and the entry of the first new labourer into the labour market, a neutral money system would be one which allowed an increase in total money incomes in proportion to the increase in the supply of labour. For in this case an increase in investment during the process of change, equal to the amount spent in wages on new labourers + the amount paid in interest in that period for the purchase of the new output of capital goods, would be accompanied by a simultaneous decision on the part of the new labourers to save an equivalent amount.

These are, of course, absurdly simplified assumptions. But as the new labourers come into the labour market they will certainly decide immediately to save a certain amount, in order to build up some money balances; and this will mean that with a neutral money system there must be some increase in Final Incomes as population grows.²

¹ It must be assumed that Increasing Returns due to the absolute increase in output are negligible.

² For a solution of this problem the reader is referred to Mr. D. H. Robertson's *Banking Policy and the Price Level*. My statement that with a constant population a neutral money system is one which keeps Final Incomes constant, is merely, I believe, a repetition of the argument in Mr. Robertson's book.

III

THE LONG- AND THE SHORT-TERM RATES OF INTEREST

BROADLY speaking, the capital of any business can be divided into fixed capital and working capital. The distinction is one of degree and not one of kind, but it so happens that in nearly every concern a broad distinction can be drawn between machinery, fixed plant and buildings on the one hand, and raw materials, advances of wages, etc., on the other. Again broadly speaking, the long-term market rate of interest is directly relevant to the financing of fixed capital and the short-term rate to the financing of working capital, in as far as it is not the practice of business to finance developments of fixed equipment through short-term borrowing or of working capital through long-term borrowing. The long-term market rate is the rate to be earned in the market on long-term fixed interest securities, in which there is no element of risk; that is to say, it is best measured by the rate on long-term government securities. The price of ordinary shares will be determined by the long-term market rate of interest and the expectation and degree of certainty of the market as to the course of profits of the firms in question.

Short-term financing is largely undertaken by the banking system, and short-term rates must be divided into two categories. First, the rate which the banking system will pay for short-term loans

made to it, *i.e.* the rate which it gives on deposits; and secondly, the rate at which it will make short-term advances to industry. These advances, we are assuming, take the form of purchases of short-term securities (or bills). We have then three market rates to consider: the deposit rate and the bill rate, which will probably vary together through the deliberate action of the banking system, and on the other hand the long-term rate of interest.

The banking system can directly alter these rates. The deposit rate it can alter simply by offering to pay more or less on deposits. The bill rate it can lower by buying and raise by selling bills in the market and by offering to discount them at a lower or higher rate. The long-term rate it can also directly effect by buying or selling long-term securities, so long as it is consistent with its principles to undertake long-term financing. If the banking system lowers the bill rate, it is possible that the total supply of bills will quickly be increased because of the rise in their price, but I am inclined to believe that this is unimportant. The only reasons for a considerable increase in the total supply of bills following a rise in their price would be either that the short-term rate of interest, *i.e.* roughly the rate of interest on working capital, was a considerable element in the costs of manufacturers, so that at the ruling prices, etc., they would borrow more to increase their output, or that the fall in the short-term rate induced manufacturers to hold a greater proportion of stocks to a given rate of output.¹ If these effects are un-

¹ The expectation of the future price of commodities is, however, much more likely to determine a manufacturer's policy in this regard than the interest cost involved in carrying stocks.

important, we should expect very considerable variations in the short-term rate of interest to have little or no direct effect on the volume of trade and employment. But if the banks are purchasing bills and if the supply of bills is not increased, then the banks can only buy existing bills, and someone must be willing to sell bills which he holds because their price has risen. There are here two possibilities: the seller of these bills may, because their price has risen, wish now simply to hold deposits instead of bills which would mean no further repercussions,¹ or he may now wish to hold long-term securities instead of short-term securities because the rate on the former has not altered, while the rate on the latter has fallen. In this case there will be a sympathetic rise in price of long-term securities. This effect is likely to be small for the reasons discussed in the next paragraph.

A fall in the deposit rate will have the effect of making persons who held deposits or who intended to save in the form of increasing their deposits, purchase bills or long-term securities instead. It will therefore have some sympathetic effect upon the bill rate and the long-term market rate of interest. The choice, however, between deposits and bills on the one hand and long-term securities on the other hand, will depend much more upon the bullishness or bearishness of the market, *i.e.* upon its expectations concerning the future price of long-term securities, than upon the relative rates of interest to be earned upon the two; and a change in the deposit rate (or bill rate) will there-

¹ This effect will be materially modified if the deposit rate falls at the same time.

fore probably have little direct effect upon the long-term rate. If, as is probable, the deposit and the bill rate are varied together by the banking system, the shifting from deposits to bills would also be small. But if the deposit rate alone is lowered by the banks, it is likely to lead to a sympathetic fall in the bill rate, since in the case in which people wish to invest money for, *e.g.*, three months, there can be no speculative element in investing in three-month bills, the price of which will be determined at the end of the three months. For this reason a fall in the deposit rate (or in the bill rate) should lead to a considerable shift from deposits to bills (or from bills to deposits), while a fall in the deposit rate or bill rate should have little effect in inducing persons to shift from deposits or bills to long-term securities.¹

We must now discuss the possibilities of the banking system maintaining equilibrium by operating on these three rates of interest. Let us

¹ Thus a fall in the deposit rate, a rise in the bill rate or a rise in the long-term rate will have some effect in inducing persons not to hold their wealth in the form of money, and this should show itself in a rise in the velocity of circulation of money against all transactions. I cannot, however, make up my mind whether it is the difference or the ratio between the deposit rate on the one hand and the bill rate or long-term rate on the other hand, that determines such action. It is, however, probable that rising or falling commodity or security prices mainly determine people's willingness to hold money. It might prove fruitful to compare an index of the velocity of money against all transactions with:

- (a) Indices of the difference and of the ratio between the deposit rate and the bill rate.
- (b) Indices of the difference and of the ratio between the deposit rate and the long-term rates.
- (c) Indices of the difference and of the ratio between the deposit rate and the rate on advances.
- (d) An index of commodity prices.
- (e) An index of security prices.

suppose that Investment falls without a corresponding rise in Expenditure, or that Expenditure falls without a corresponding rise in Investment.

(1) The banking system might lower the deposit rate, and this might have the following effects:

(a) It might discourage Savings and so lead to an increase in Expenditure. This effect is, however, likely to be small. A fall in the deposit rate might alter the form in which Savings are made, but would be unlikely to alter the aggregate amount of savings to any appreciable extent.

(b) It might lead to a sympathetic fall in the bill rate or in the long-term rate. It is unlikely, however, as we have seen, to affect the long-term rate considerably, while it is probable that it will have a significant effect upon the bill rate. The effects of a fall in the bill rate and the long-term rate are considered under headings (2) and (3).

(2) The banking system might directly lower the bill rate. A fall in the bill rate might have any of the following effects:

(a) It might discourage Savings and so lead to an increase in Expenditure. This effect is likely to be small.

(b) It might lead to an increased investment in working capital, either because interest on working capital was a significant factor in manufacturers' costs, so that a fall in this rate induced them to plan for a larger output, or because it decreased the cost of holding stocks and induced manufacturers

to hold a larger proportion of stocks to every given rate of output. The attractiveness of holding stocks is, however, likely to be determined mainly by the expectations regarding the future course of prices. The increased investment in working capital will be smaller, the smaller the proportion of total costs which is formed by interest on working capital, and the more quickly the marginal advantages of holding stocks to a given rate of output fall.

(c) It might lead to an increased investment in fixed capital financed by short-term borrowings. The importance of this factor will depend mainly upon the banking and industrial conventions of the community.

(d) It might lead to a sympathetic fall in the long-term rate. The effects of such a fall in the long-term rate are considered under (3). This sympathetic fall is, however, likely to be small (*v. above*, p. 27).

(3) The banking system might meet the situation by a direct lowering of the long-term rate by purchasing long-term securities. A fall in the long-term rate might have any of the following effects:

(a) It might lead to a decrease in Savings and so to an increase in expenditure on consumption goods. This effect is likely to be much more important than in the case of a fall in the deposit or in the bill rate, but I suspect that it is not likely to be of very great importance (*v. Chapter VI*).

(b) It might lead to an increase in Investment in fixed capital. This effect is studied in detail in

Chapter IV, and is in my opinion of great importance.

(c) It might lead to a sympathetic fall in the bill rate, the effects of which are considered above. This effect is likely to be small (*v. above*, p. 27).

The converse of all these considerations would hold good if the banks attempted to meet a situation in which Investment (or Expenditure) had risen without a corresponding fall in Expenditure (or Investment). We have seen that changes in the deposit rate or bill rate, which are likely to move together and which we will call changes in the short-term rate, are unlikely to cause directly very appreciable sympathetic changes in the long-term rate. It follows that if the banks are only willing to operate on the short-term rate, larger variations in the proportion between the short-term and the long-term rates of interest will be necessary to maintain equilibrium,—if in fact it is possible for the banking system to maintain equilibrium at all without operating directly on the long-term rate; and the variations in the proportion between the short-term and long-term rates must be larger, (i) the less frequent is the practice of borrowing on short term for financing developments of fixed capital, (ii) the smaller the proportion of manufacturing costs which is formed by interest on working capital, (iii) the more attention manufacturers pay to expectations of price movements rather than interest costs in determining whether to hold more or less stocks, (iv) the more quickly the marginal advantages of holding stocks to a given rate of output decrease with

an increase in stocks, (v) the less a change in short-term rates leads to a shift from deposits or bills to long-term securities (*i.e.* the more persons consider the future possible movements in long-term security prices in deciding their short-term “investments”), and (vi) the less a fall (or rise) in short-term interest rates leads to a decrease (or increase) in Savings.

In the chapters which follow I shall talk of a fall or rise in the market rate of interest. I shall be considering principally the effects of a fall or rise in the long-term rate of interest and its effects upon investment in fixed capital, but the reader must always bear in mind what is said in this chapter on the relation between changes in the short-term and long-term rates and their effects on investment in working and fixed capital.

IV

THE MARKET RATE OF INTEREST AND NET INVESTMENT IN FIXED CAPITAL

IN this chapter we shall discuss the effects which changes in the market rate of interest have upon Net Investment in Fixed Capital. To do this I must first define the way in which I shall use the term "profits". Prime Profits¹ are defined as a firm's total receipts in a given period minus its prime costs, prime costs being defined as those costs which vary in the short period with a variation in the firm's output, and which would be nil if the firm's output were nil and the firm maintained in readiness to start producing at any moment. Thus prime costs will include a firm's labour costs, cost of raw materials and interest on working capital, *i.e.* on the capital represented by raw materials and wage advances, which can be increased or decreased in the short period. Prime Profits, then, are total receipts for sale of product minus these prime costs. Profits are defined as Prime Profits minus fixed costs, *i.e.* those money payments which must legally be made to avoid bankruptcy, and which cannot be varied in the short period by variations in the output; these fixed costs are represented by managers' salaries, debenture interest, rates, cost of maintain-

¹ My use of the terms Prime Profits and Profits is due to Mr. R. F. Kahn, to whom I owe this method of analysing a firm's costs in the short period.

ing a skeleton staff, etc. Profits minus the allowance which must be made for depreciation to maintain the firm's fixed capital,¹ whether these funds are actually spent on fixed capital goods or merely put aside to meet a future depreciation liability, we shall call Shareholders' Profits. Net Profits are defined as Shareholders' Profits + debenture interest payments, *i.e.* as Total Receipts – Prime Costs – Fixed Costs other than debenture interest payments – allowance to be made for depreciation. Net Profits, therefore, represent the Profits which can be capitalised at the current rate of interest, allowing for risks and expectations, to assess the value of the firm's fixed capital. Thus Total Receipts for sale of product = Prime Profits + Prime Costs = Profits + Fixed Costs + Prime Costs = Shareholders' Profits + Allowance for Depreciation + Fixed Costs + Prime Costs = Net Profits + Allowance for Depreciation + Fixed Costs other than debenture interest payments + Prime Costs.

It will be the object of every firm in the short period to maximise its Net Profits. Since in the short period it can, by varying its output, only vary its Prime Costs, its Net Profits will be maximised when its Prime Profits are maximised. Its Prime Profits will be maximised when it is producing such an output that its Marginal Prime Costs, *i.e.* the addition to its Prime Costs due to producing one

¹ Depreciation of working capital is, of course, included in prime costs. To a certain extent, as Mr. Kahn has pointed out to me, the depreciation allowance to be made for fixed capital must enter into prime costs, since a firm's fixed capital will be worn out more quickly if it is used more intensively; but for all relevant fluctuations in output this consideration is probably not very important. For a discussion of the term "allowance which *must* be made for depreciation", see above, p. 6, footnote.

more unit of output, are equal to its Marginal Revenue,¹ i.e. the addition to its Total Receipts due to the sale of the last unit of output. If it produces more than this, it will add more to its Prime Costs than it adds to its Total Receipts, while if it produced less it would be able to add more to its Total Receipts than to its Prime Costs by producing another unit of output. In conditions of perfect competition the Marginal Revenue is for a single firm constant for every value of its output, and is equal to the market price of the firm's product. When the firm is faced with a partial demand curve, either because there is buyer's preference between rival sources of supply of the commodity or because the firm produces an appreciable proportion of the total output of the commodity, the Marginal Revenue of the firm will fall with every increase in its output.² Any firm, therefore, in the short period will maximise its Prime Profits and so its Net Profits by producing that output for which its Marginal Prime Cost is equal to its Marginal Revenue.³

¹ Its Marginal Revenue for any output is measured by the height of the curve, which Mr. R. F. Harrod has called "The Increment of Aggregate Demand Curve" (*v. Economic Journal*, June 1930, p. 238). The less cumbersome name "Marginal Revenue Curve" is, I believe, the invention of Mr. E. A. G. Robinson.

² It is not my intention to discuss this question in any detail. The reader is referred to the article by Mr. Harrod to which reference is made above.

³ It may pay a firm to produce an output for some time rather than to close down, even if its Net Profits are negative. It is possible that it is maximising its Prime Profits, and that its Prime Profits are +ve, but that its Prime Profits are < its fixed costs other than debenture interest + the allowance to be made for depreciation. Its Net Profits are then -ve, but would be still smaller if it remained in existence but produced nothing for the time being. If it expects a revival, it may choose not to go into liquidation. If its Prime Profits are +ve, but < its Fixed Costs

A rise in the price of a firm's product or, where competition is not perfect, a rise in the partial demand curve for a firm's product, will induce it to increase its output, and will at the same time increase its Net Profits. Similarly a fall in its Prime Costs, *i.e.* a fall in the wage-rate or in the price of its raw materials, will induce it to increase its output in the short period and will also raise its Net Profits. A fall in its fixed costs other than debenture interest, or in the allowance to be made for depreciation, *i.e.* in the rate of depreciation of its fixed capital or in the market price of capital goods, will not induce it to increase its short-period output, but will raise its Net Profits.

I shall use two further terms, namely, the Average Rate of Net Profits and the Marginal Rate of Net Profits. The Average Rate of Net Profits of a firm is defined as

$$\frac{\text{Net Profits}}{\text{Replacement cost of its fixed capital}^1}$$

i.e. as

$$\frac{\text{Net Profits}}{\text{Amount of fixed capital in use} \times \text{the market price}^2 \\ \text{of a unit of fixed capital goods}}$$

The Marginal Rate of Net Profits is defined as

$$\frac{\text{Marginal Net Profits}}{\text{Market price of a unit of fixed capital goods}^3}$$

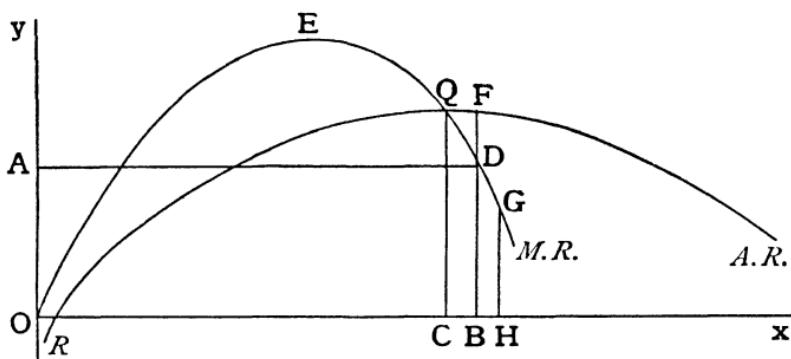
Marginal Net Profits represents that addition to its Net Profits which a firm could make by taking on

including debenture interest, and if it wishes to remain in existence in hope of a revival, it will pay it to go on producing, though in this case it must be living on its reserves or borrowing to meet part of its Fixed Costs, even if it is paying nothing on its ordinary shares.

another unit of fixed capital and using this additional unit of fixed capital in the most profitable manner. In order to use an additional unit of fixed capital in the most profitable manner a firm would increase its output, but might increase or decrease the amount of other factors, *i.e.* of labour, of raw materials and of managers, which it employed (*v.* below, p. 44). It would necessarily increase the allowance to be made for depreciation and also possibly some fixed costs, such as its payment of rates. Its Marginal Net Profits will then be equal to the Increase in its Total Receipts — the Increase in allowance to be made for depreciation — the Increase or + the Decrease in its Prime Costs and its Fixed Costs other than payments of debenture interest, due to employing one more unit of fixed capital in the most profitable manner.

Let us suppose that the price of the product of any industry, the price of its raw materials, the wage-rate it has to pay, the salaries it has to pay per manager and any rates of taxation it has to pay, are all constant and expected to remain constant. The rest of this chapter is written on this assumption, which is modified in the next chapter. Then in this case, given the amount of fixed capital goods which it has in use, every firm's output will be constant, *i.e.* it will be that output for which its marginal prime costs are equal to its marginal revenue, and its Net Profits, and so its Average Rate of Net Profits, will be constant. But for every given amount of fixed capital in use, any particular firm would be making a different Average Rate of Net Profits. In the accompanying diagram units of fixed

capital of any firm are measured along the OX axis and Rates of Net Profit are measured along the OY axis. The height of the curve R—A.R. measures the Average Rate of Net Profits which a particular firm expects it would make in these conditions against every amount of fixed capital it used. This curve will rise at first up to a point Q, since, as is well known, a firm may be too small. At this point the curve will fall; the curve must fall at some point,



since there is a limit to the efficient size of every firm. The height of the curve O—M.R. represents the expected Marginal Rate of Net Profits of the firm for every amount of fixed capital which it uses. Since the Marginal Rate of Net Profits of any firm = the addition to its Net Profits caused by using another unit of fixed capital in the most profitable manner \div the price of a unit of fixed capital, it follows that the Average Rate of Net Profits will be rising with every increase in fixed capital, so long as the Marginal Rate is $>$ the Average Rate, and that the Average Rate will be falling, so long as the Marginal Rate is $<$ the Average Rate. The curve O—M.R. will therefore cut the curve

R—A.R. at Q, the highest point of the curve
R—A.R.¹

If the market rate of interest is $>$ QC, the firm will have no inducement to replace any of its fixed capital, since on no amount of fixed capital could it earn an Average Rate of Net Profits as great as the market rate of interest, and it would therefore be more profitable to "invest" the cost of replacing its capital in, *e.g.*, government stock.² It will therefore be undertaking an amount of Net Disinvestment, equal to the amount of fixed capital, which it actually has \times the price of fixed capital goods. If the market rate of interest is $=$ QC, it will only be in long-period equilibrium, if it has an amount of fixed capital OC in use; for if it has less (or more), it would pay it to use more (or less), since its Marginal Rate of Net Profits would be $>$ (or $<$) the market rate of interest. When it has an amount OC in use, it will be making an Average Rate of Net Profits just equal to the market rate of interest. It will therefore be undertaking an amount of Net Investment equal to (OC – the amount of fixed capital which it already has in use) \times the price of a unit of fixed capital goods.

If the market rate of interest = OA (*i.e.* is $<$ QC),

¹ The curve R—A.R., showing the Average Rate of Net Profits against every amount of Fixed Capital in use, need not pass through the origin. Suppose that there are certain Fixed Costs which do not vary with variations in the amount of Fixed Capital employed by the firm, and let these Fixed Costs be called K. Then if a curve is drawn passing through the origin and "average" to the "marginal" curve O—M.R., at any value along the OX axis, the difference between the height of this curve and the curve R—A.R. multiplied by OX will be equal to K.

² It is to be remembered that we are in this chapter assuming that all prices are constant and expected to remain constant, so that no revival due to price changes is expected.

it will only be in long-period equilibriums if it has an amount OB of fixed capital in use. Again, in this case if it had less (or more) it would pay it to put in more (or let some of its capital wear out without replacing it), since its Marginal Rate of Profits would be $>$ (or $<$) the market rate of interest, so that it would pay it to borrow more (or "invest" some of the replacement cost of its capital in government stock) in order to increase (or decrease) the amount of capital it was using. In this case it will be undertaking Net Investment equal to $(OB - \text{the amount of fixed capital it already has}) \times \text{the price of capital goods}.$ ¹

The amount of additional fixed capital being ordered by any particular firm will thus depend upon the relation between the market rate of interest and the Marginal Rate of Net Profits, provided always that the market rate of interest is not $> QC$, the highest possible Average Rate of Net Profits of the firm. The amount of Net Investment undertaken by any firm will be greater the lower is the market rate of interest and the higher is the curve O—M.R. after the point Q for every amount measured along OX. Again, a given fall in the market rate of interest will cause a greater increase in Net Investment by the firm the less quickly the curve O—M.R. falls. In the diagram on p. 38 a fall in the

¹ The amount of Net Investment undertaken by particular firms, since Net Investment is an amount of money spent per period of time, will only vary directly with this term and the similar term used above on the assumption that the time taken between the decision to put in more capital and the final installation of that capital will not change with changes in the actual amount to be installed. All that can in reality be said is that Net Investment by particular firms will vary in the same direction as, though not necessarily in proportion to, this term.

rate of interest from BD to HG will cause an increase in Net Investment equal to BH \times the price of capital goods. This increase will be greater the less quickly the curve O—M.R. is falling.¹

The Average Rate of Net Profits

$$\text{Net Profits} = \frac{\text{Amount of fixed capital in use} \times \text{Price of a unit of fixed capital}}{\text{Price of a unit of fixed capital}}$$

and the Marginal Rate of Net Profits

$$\text{Marginal Net Profits} = \frac{\text{Price of a unit of fixed capital}'}{\text{Price of a unit of fixed capital}}$$

where Marginal Net Profits = Increase in Total Receipts – the Increase in Allowance to be made for depreciation – the Increase or + the Decrease in its Prime Costs and Fixed Costs other than payments of debenture interest, due to employing one more unit of fixed capital in the most profitable manner. It is clear, then, that a rise in the price of a firm's product (or alternatively, a rise in the partial demand curve for a firm's product) will raise the Average and the Marginal Rates of Net Profits of a firm for every amount of fixed capital in use, since it will raise Total Receipts, and will also raise the Increase in Total Receipts to be obtained from the most profitable use of another unit of fixed capital. It will therefore increase the Net Investment undertaken by any firm, and may also, if it raises the Average Rate of Net Profits at its highest point Q above the market rate, induce a large decrease in Net Disinvestment.

A decrease in the rate of depreciation of fixed

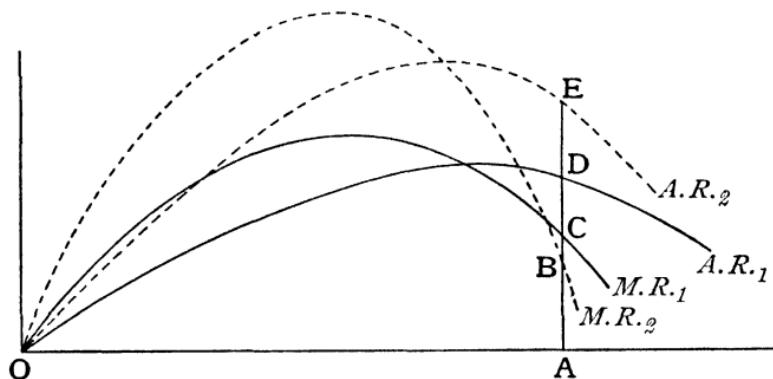
¹ For the conditions which determine how quickly this curve will fall, see below, pp. 43 and 44.

capital will also raise Average and Marginal Rates of Net Profits, because it will decrease the allowance for depreciation and the increase in the allowance for depreciation due to the use of an additional unit of fixed capital. It will therefore lead in the same way to an increase in Net Investment on the part of the particular firm.

A fall in the wage-rate or in the price of raw materials or in Fixed Costs, due to a fall, e.g., in salaries per manager, will certainly raise the Average Rate of Net Profits of a firm for every amount of capital it uses, since it will raise Net Profits. In this case, if it raises the curve R—A.R. (p. 38) so that QC becomes $>$ instead of being $<$ the rate of interest, it will decrease Net Disinvestment. But it is in this case uncertain whether a fall in wage-rates, in the price of raw materials or in Fixed Costs due to a fall, e.g., in salaries per manager, would raise or lower the Marginal Rate of Net Profits for every given amount of fixed capital in use. If the most profitable use of an extra unit of fixed capital involved an increase in labour, raw materials or salaried managers employed, such a fall in these prices would raise the Marginal Rate of Net Profits; but if, on the other hand, the most profitable use of another unit of fixed capital involved its substitution for a certain amount of labour, raw materials or management, a fall in these prices would lower the Marginal Rate of Net Profits, since it would mean a fall in the price of those factors, for which capital could be substituted. In the following diagram the curve of the Average Rate of Net Profits changes from O—A.R.1 to O—A.R.2, and in the second position it is higher throughout. But

the curve of Marginal Net Profits changes from O—M.R.1 to O—M.R.2. For the amount of fixed capital OA, while the Average Rate has increased by ED, the Marginal Rate has fallen by BC.

That is to say, the height of the Marginal Rate of Net Profits depends not only upon the height of the Average Rate of Net Profits, but will be lower and will fall more quickly the more quickly the Average Rate of Net Profits is falling with every increase in the amount of fixed capital used. The



Average Rate of Net Profits will fall more quickly for every increase in the amount of fixed capital used, (1) the more quickly the difficulties of co-ordination of management, etc., increase with an increase in the firm's size, (2) the less perfect is competition and the more quickly the price of the firm's product is expected to fall with an increase in the output, (3) and the less great are the advantages of substituting fixed capital for other factors of production and the more quickly these possibilities fall off with an increase in the proportion of fixed capital to other factors employed. These factors, then, determine the height of the Marginal Rate of Net Profits and

the rate at which the curve O—M.R. will fall with every increase in the amount of fixed capital used. We have seen above (p. 40) that the increase in Net Investment undertaken by any firm, consequent upon a given fall in the market rate of interest, will be less the more quickly the Marginal Rate of Net Profits falls. It will therefore be less, (1) the more quickly the difficulties of management, etc., grow with an increase in the size of a firm, (2) the less perfect is competition, and (3) the more quickly the technical possibilities of substituting capital for other factors fall off with every increase in the proportion of capital to other factors used.

In the case in which (1) the disadvantages of increasing the size of the firm are great, and (2) competition is very imperfect, but (3) there are large possibilities of substituting capital for other factors, any increase in the fixed capital equipment would mean a substitution of capital for the other factors. In this case a fall in the price of the other factors—labour, raw materials or management—while, as we have seen, it would certainly raise the Average Rate of Net Profits to be gained on every amount of fixed capital, would increase the rate at which the Average Rate of Net Profits fell with every increase in the amount of capital used. For the advantages of substituting capital for the other factors would be diminished by the fall in the price of these other factors. The Marginal Rate of Net Profits would in this case be lowered by a fall in the prices of factors other than fixed capital, and this would lead to a decrease in Net Investment by particular firms. A rise in the price of these other factors would in these circumstances raise the Mar-

ginal Rate of Net Profits, and so lead to an increase in Net Investment by particular firms, provided always that it did not so lower the curve of the Average Rate of Net Profits that the highest point in this curve became lower than the market rate of interest; for if this happened, the firm would no longer replace any of its capital.¹

Conversely, (1) the less are the disadvantages of increasing the size of the firm, (2) the more perfect is competition, and (3) the less are the possibilities of substituting capital for other factors of production, the more probable is it that any increase in the fixed capital equipment of a firm will be associated with an increase in the amount of labour, raw materials and management which it employs. If this is the case, a fall in the price of any of these other factors will not only raise the Average but also the Marginal Rate of Net Profits for every value of fixed capital in use, and will therefore certainly increase the amount of Net Investment.

There may be certain Fixed Costs which do not vary with the amount of fixed capital used, or certain Fixed Costs, *e.g.* rates assessed at a certain amount according to the value of the fixed capital used, which will certainly increase with the amount of fixed capital used. In the first case a fall in these

¹ It is not my intention in this book to deal with the effect of changes in money wage-rates in any detail. But this consideration would be of prime importance in such a study. A rise in money wages would—if we can abstract for the minute from the other changes it would involve—lower the Average Rate of Net Profits in every firm and may for this reason discourage Net Investment; but it might raise the Marginal Rate of Net Profits of a firm and so encourage Net Investment by that firm, and thus lead to increased employment in industries producing capital goods.

Fixed Costs will raise the Average Rate without changing the Marginal Rate of Net Profits, and in the second case will raise the Average and the Marginal Rates of Net Profits. A fall in such costs will therefore certainly increase the amount of Net Investment.¹

A fall in the price of fixed capital goods will raise the Average Rate of Net Profits, both because it will lower the allowance for depreciation and so raise Net Profits, and also because it is upon the replacement cost of the firm's fixed capital that the Average Rate of Net Profits is assessed. It will also raise the Marginal Rate, both because it will lower the Increase in depreciation allowance due to using one more unit of fixed capital and so raise Marginal Net Profits, and also because it is upon the price of a unit of fixed capital that the Marginal Rate of Net Profits is assessed. It will therefore certainly increase the amount of additional fixed capital goods ordered. The increase in the amount ordered will be greater, (1) the greater the number of firms which are induced by the rise in the Average Rate of Net Profits to replace their capital instead of letting it wear out, and (2) the less quickly the Marginal Rate of Net Profits falls with every increase in the amount of fixed capital used. Net Investment will only be increased by a fall in the price of fixed

¹ Thus the valid arguments for "derating" as a method of combating unemployment rest upon the fact that, since a remission of rates with a corresponding increase in other forms of taxation will raise Average and Marginal Rates of Net Profits without directly affecting the market rate of interest, it will stimulate Net Investment and increase the demand for capital goods. It will not otherwise directly affect short-period output, which depends upon the relation between marginal *prime* cost and price.

capital goods, if the price of fixed capital goods falls in a smaller proportion than the amount of additional capital goods ordered increases. If the fall in the price of fixed capital goods is greater than this, the amount of Net Investment will be decreased by a fall in the price of fixed capital goods.

Net Investment may, however, take place not only to increase the capital equipment of existing firms, but also to construct new firms to enter an existing industry, or to construct new firms for a new industry, either to produce entirely new commodities which it was not profitable to produce before, or else to produce commodities by a known process which it was not, however, profitable to employ before. Net Investment will take place to build new firms to enter any industry, if the highest point on the curve of the Average Rate of Net Profits of the representative firm in that industry is $>$ the market rate of interest; while if it is $<$ the market rate of interest, no new firms will enter the industry. A fall in the market rate of interest or a rise in the curve of the Average Rate of Net Profits in the representative firm, due to any of the causes discussed above, may increase Net Investment for this purpose. Net Investment will take place for the purpose of building entirely new industries, if the highest point in the curve of the potential Average Rate of Net Profits of a representative firm in that industry, *i.e.* the Rate which such a firm would be earning if it were in existence, is $>$ the market rate of interest. Thus a fall in the market rate of interest, or a change in any prices which raises the curve of the potential Average Rate of Net Profits of such a repre-

sentative firm, may increase Net Investment for this purpose.

NOTE TO CHAPTER IV

Mr. Keynes' Definitions in the "Treatise on Money"

This work is so largely based on the work of Mr. Keynes that it is necessary for me to explain why I have not used the term Profits in the sense in which Mr. Keynes uses the term. There are two main difficulties in Mr. Keynes' definition of the terms Profits, Earnings and Savings, which made me decide not to employ them in his sense.

In the first place, Mr. Keynes would, I believe, maintain that with his definitions Savings might equal the Value of and the Cost of Investment, at a time when some Investment is taking place; he would also, I think, assert that the Value of Investment might exceed the Cost of Investment and the Cost of Investment exceed Savings by a given amount, and that at the same time neither the general price level nor the price level of consumption goods need be rising, but need only be of a sufficient height to satisfy the equations $\pi = \frac{E}{0} + \frac{I - S}{0}$ and $P = \frac{E}{0} + \frac{I' - S}{R}$.

With his definitions the first of these assertions is impossible. Mr. Keynes' definition of a position of no "profits" or "losses" is that the entrepreneur's receipts should be such as to give him no incentive to restrict or expand output; and if Savings = Value of Investment = Cost of Investment, there are with Mr. Keynes' definitions no "profits" or "losses". However, unless there are "profits" and an inducement to expand output, there would be no incentive to Invest;¹ or, in other words, if Savings = Value

¹ While there was no incentive for any net amount of Investment, some firms might have an incentive to Invest, while others had an incentive to Disinvest an equal amount. Since it takes some time to let fixed capital goods wear out, while it is possible to order new capital goods at once, this position might give rise to some Investment, though the net incentive to Invest is nil. This consideration, however, does not invalidate the main point in the argument.

of Investment, Value of Investment = 0. With these definitions Savings must be < Value of Investment, for Investment to be +ve; and if Savings are > Value of Investment, Investment must be -ve, i.e. Disinvestment must be taking place. This is really only of importance for the definition of a dynamic equilibrium. If equilibrium is defined as the position in which $S = I$, then it turns out that equilibrium involves a long-period static equilibrium, since when $S = I$, $I = 0$ and $\therefore S = 0$.

If, however, the definitions are altered so as to make this first assertion possible, namely, that Savings can = Value of Investment and the Cost of Investment, even if Investment is taking place, the second assertion becomes impossible. In the cost of production, i.e. in $\frac{E}{O}$, we must now include a payment to entrepreneurs which is sufficient both to reward the labour included in the "entrepreneur-ing" necessary to maintain the given output and also to induce them to indulge in just that amount of Investment in which they are indulging. With these definitions it is easy to see that Savings may equal the Value of Investment and the Cost of Investment, even when capital is increasing. But now the second assertion becomes impossible, namely, the assertion that the Value of Investment may exceed the Cost of Investment and the Cost of Investment Savings, while at the same time the price levels *need not be rising* but need only be of a sufficient height to satisfy the equations $\pi = \frac{E}{O} + \frac{I-S}{O}$ and

$$P = \frac{E}{O} + \frac{I' - S}{R}.$$

For with the present definition of Profits and Savings, if the Value of Investment exceeds Savings, entrepreneurs must not merely have an inducement to invest in new capital to expand their output; but, since they are now making "profits" over and above their costs, and since these costs now include the remuneration necessary to induce them to continue the present rate of investment, they must also have an inducement to increase the

rate of investment. In this case, since the rate of investment would be increasing, the price levels would necessarily in fact be rising.

With this revision of the definitions, moreover, any position in which prices were constant, apart from autonomous changes in Savings and Costs of production, would become a position of equilibrium, if equilibrium is still defined as the position in which Savings = Investment. In other words, a position at the bottom of a slump, in which prices were at their lowest but constant, would with these definitions be a position in which Savings = Investment; and I feel certain that Mr. Keynes wishes to avoid such a definition. It was these difficulties of defining a position of dynamic equilibrium with Mr. Keynes' terms which first made me decide not to use them.

But, in the second place, the simplicity of exposition which is possible for his argument depends upon an assumption of independence between Mr. Keynes' "Incomes", "Costs" or "Earnings" (E) and the market rate of interest. Unfortunately, with his definition of the term, E is directly affected by changes in the market rate of interest. If the market rate of interest falls, the amount of money which any firm must receive in order to have no incentive to expand or contract its output would also necessarily fall, since it would need to earn a smaller rate on its capital to remain in long-period equilibrium. In other words, one of the important factors in Mr. Keynes' "costs" is the market rate of interest.¹ For this reason a fall in the market rate of interest, before it has any effect upon Investment or upon the amount spent on consumption goods, will lower E , and will thus lower S , which is the difference between E and expenditure on consumption

¹ In fact, if a larger proportion of final money incomes goes to capital than to labour, it is more important than money wage-rates in determining E . The substitution of $\frac{1}{e} \cdot W$ for $\frac{E}{O}$ (*Treatise on Money*, vol. i, p. 135), where e is the coefficient of efficiency and W the rate of earnings per unit of human effort, is much too great a simplification.

goods. Although this consideration would make no difference to the validity of Mr. Keynes' main theory, it does make an accurate exposition of the causal relationship between the price level and the market rate of interest much less simple with his definitions.

V

EXPECTED PRICE MOVEMENTS AND INVESTMENT

WE have in the last chapter discussed the effects of changes in the market rate of interest on Investment on the assumption that the Average and Marginal Rates of Net Profits were not expected to change in the future, because all commodity prices, money wage-rates and other prices were expected to remain unchanged in the future. When this assumption is removed there is a second large body of considerations, other than a comparison of the market rate of interest with the Average Rate of Net Profits and with the Marginal Rate of Net Profits, which will determine the amount of Investment being undertaken.

(1) The present market rate of interest, at which money can be borrowed, will be compared with the Marginal Rate of Net Profits and with the Average Rate of Net Profits which it is expected will be earned on the capital in the future when it has been installed, in order to decide how much a firm will invest at the moment for purposes of developing its capital equipment and how much will be being invested to set up new firms.¹

Thus if the price of the product is expected to be higher in the future, both the Average and the

¹ This statement is materially modified under heading (2).

Marginal Rates of Net Profits in the firms in the industry producing these commodities will be expected to be higher in the future, and Investment for all purposes in this industry will be greater than it would have been, if only the considerations discussed in the last chapter had been relevant.

If the wage-rate, the price of raw materials or fixed costs are expected to be lower, the Average Rate of Net Profits will be expected to be higher in the future, and Investment will for this reason be greater for the purpose of setting up new firms in any industry. But, as we have seen in the last chapter, these changes may raise and may lower the Marginal Rate of Net Profits of a firm. In the former case such an expectation would increase, and in the latter case decrease, Investment for the purposes of capital expansion of existing firms.

(2) A fall (or rise) in the price of the goods used for fixed capital in any industry will, as we have seen, raise (or lower) Average and Marginal Rates of Net Profits. But the expectation that the price of fixed capital goods will be lower (or higher) in the future, although it means that Average and Marginal Rates of Net Profits are expected to be higher (or lower), will not afford any inducement to increase (or decrease) Investment in fixed capital. The reason for this is, of course, that the expenditure on Investment in fixed capital must be undertaken at the present prices of fixed capital goods, in order to earn the expected Average or Marginal Net Profits in the future.

On the contrary, an expectation that the prices of fixed capital goods will be lower (or higher) will

lead to a postponement (or speeding up) of expenditure on these goods for replacement purposes, and for those purposes of Investment that are already being contemplated. The expectation of a fall (or rise) in these prices will therefore lead to a fall (or rise) in Investment. In the same way, an expectation of a fall in raw material prices—even though it will cause an expectation certainly of a higher Average Rate of Net Profits and probably of a higher Marginal Rate of Net Profits, and will therefore cause an increased Investment in fixed capital—and the expectation of a fall in the prices of finished commodities will cause a decrease in Investment or an increase in Disinvestment in working capital in the form of variable stocks, in order to take advantage of the expected price movement.

(3) An expectation that the rate of interest will fall will cause a postponement of borrowing for the purposes of Investment, in order to wait for the more favourable conditions, and this may well cause the postponement of Investment which would otherwise have taken place immediately. The expectation that the rate of interest will rise may cause an earlier borrowing for the purposes of Investment which is contemplated in the near future, and this may well cause a speeding up of the programme of Investment. For if the money is borrowed by the issue of long-term securities to forestall a future rise in the long-term rate, there would clearly be no advantage in putting the money for the time being in other long-term stock until it was needed for the Investment programme, since this would be

equivalent to borrowing at the higher rate. On the other hand, to borrow the money on long-term and to lend for a time on short-term would involve a loss, if the short-term rate was lower than the long-term rate. The greatest advantage from the expected fall in the rate might thus be obtained by speeding up the programme of Investment.

It is undoubtedly expectations of this kind of the future movements of prices, etc., which introduce the "psychological" elements of business optimism and pessimism into a trade boom or depression. In a boom, when all commodity prices are rising and wage-rates are rising slowly, if at all, a great deal of investment will be being undertaken in every industry, because Rates of Net Profits are expected to be high in the future and because the prices of capital goods are rising. In a depression, the opposite expectations will cause a similar discouragement to Investment. These optimistic or pessimistic expectations may be greatly exaggerated.¹ In periods, then, in which prices are moving rapidly, the rate of interest may lose its power as a regulator. In such periods variations in the rate of interest

¹ It is of great interest to construct an index of "expected profits" by multiplying an index of ordinary share prices by an index of the long-term rate of interest, which gives a rough index of net profits expected in the future. If this could be compared with an index of actual profits, some idea of the importance of unwarranted business optimism and pessimism might be obtained. The index of "expected profits" is of interest itself, since it usually moves in the same direction as the index of ordinary share prices. This is not, however, always the case. When all security prices are moving up, it would appear that there is a period of business "optimism", but if the price of fixed interest shares is rising sufficiently, the index of "expected profits" will be falling, which would suggest that the period is in reality one of "pessimism".

might have to be very violent in either direction to maintain equilibrium.¹

The last paragraph has shown the peculiar importance of the considerations discussed in this chapter in any study of dynamic disequilibrium. It is not the purpose of this book to discuss such disequilibrium, but rather the conditions and problems of dynamic equilibrium. The considerations raised in this chapter are, however, extremely relevant in this connection as well. We have seen in Chapter II that the maintenance of equilibrium does not mean the maintenance of a constant price level nor the maintenance of a constant money wage-rate. It may mean over a period of time that prices should fall, while money wages rise or remain constant. In this case the rate of interest, in order to give an inducement to an amount of Investment sufficient to maintain equilibrium, must be low enough to counteract the fact that falling prices will of themselves discourage investment. Conversely, the maintenance of equilibrium may imply that prices rise over a period of time, and in this case the rate of interest must be sufficiently high to counterbalance any inducement to excessive Investment caused by this fact.

¹ This sentence expresses the main argument for a controlled policy of public expenditure with a co-ordinated monetary policy. When prices are falling, investment by the State at the given rate of interest to stop the fall should be undertaken, so that the market rate of interest may again control the situation. Conversely, such expenditure should be cut to a minimum, when prices are rising rapidly, so that the rate of interest may again be used as a control.

VI

EXPENDITURE AND THE MAINTENANCE OF EQUILIBRIUM

IN this chapter I shall discuss the main factors which determine the amount of Expenditure which individuals will be undertaking. Savings are defined as the amount of Individuals' Incomes in any period of time — their expenditure on consumption goods in that period (*v. above*, p. 8). In order to facilitate the discussion, I wish to make certain further definitions. Real Income of individuals I define as Individual Income \div the price of consumption goods, *i.e.* as the number of consumption goods which the Income of individuals, whether it is in fact saved or spent, would purchase if it was all spent on consumption goods at the ruling price of consumption goods. Real Expenditure is defined as Expenditure \div the price of consumption goods, *i.e.* as the number of consumption goods actually bought. Real Savings is defined as Savings \div the price of consumption goods, *i.e.* as the number of consumption goods which individuals do without in any period of time out of their Real Income.

Apart from alterations in the rate of interest, Expenditure will be affected by changes in Individuals' Incomes and in the price of consumption goods. It may be admitted that an increase in Real Incomes will cause an increase in Real Expenditure and in Real Savings, so that part of the increase in Real

Income is used to raise the present standard of living and part to make a greater provision for the future. This means that an increase in Real Income, caused by an increase in Individuals' Incomes, will cause an increase in Savings as well as an increase in Expenditure. But an increase in Real Incomes caused by a fall in the price of consumption goods, Individuals' Incomes remaining constant, may lead to a decrease in Savings together with an increase in Expenditure, or to an increase in Savings with a corresponding decrease in Expenditure; for within certain limits, *i.e.* so long as Savings or Expenditure do not decrease in a greater proportion than prices have fallen, either of these is compatible with an increase in Real Savings and in Real Expenditure. The condition that an increase in Real Incomes, whether it is due to an increase in Individuals' Incomes or to a fall in the price of consumption goods, should in any case lead to an increase in Savings, is that a man's Real Savings should be a greater proportion of his Real Income, the larger is his Real Income. I think that we may also assume that this is so, although it is by no means so certain as the assumption already made that his Real Savings increase with every increase in his Real Income. We find that rich persons save a greater proportion of their incomes than poor persons, and it is probably also true that the richer a man becomes, the larger is the proportion of his income which he saves.

If we make these two assumptions, it follows that Expenditure will be decreased (or increased) by (1) a fall (or rise) in Individuals' Incomes, (2) a fall (or rise) in the price of consumption goods and (3) a

redistribution of Individuals' Incomes, so that a larger (or smaller) proportion goes to the richer persons in the community.

The remaining factor, which will determine Savings, is the rate of interest. I shall have to content myself with a brief summary of considerations which are already well known. Persons who are saving may roughly be divided into three classes: (1) Some are saving mainly in order to obtain a certain fixed income for the future for themselves or for their families. Such persons will decide to save less if the rate of interest rises, and more if it falls, since they can obtain a given fixed income on a smaller capital sum. (2) Some persons are only induced to save by the height of the rate of interest, because the present sacrifice of Real Expenditure is just made worth while by the increase in future Real Expenditure which is provided by the rate of interest. Such persons will save more when the rate rises and less when it falls. (3) Some persons save automatically the difference between their income and the expenditure necessary to maintain a certain standard of living. The Savings of such persons will be unaffected by changes in the rate of interest.

It is probable, I believe, that the third class of savers provides a very considerable proportion of the amount of savings. Further, in my opinion the second class of savers is probably more important than the first, though the first class is certainly important. If this is so, it follows that net Savings are likely to be very little affected by changes in the rate of interest, because one large class of savers will be completely unaffected, while of the rest some will be affected one way and others in the opposite

manner; but it is probable that a rise in the rate will slightly increase and a fall slightly decrease Savings. In what follows, therefore, I shall assume, unless it is definitely stated otherwise, that a rise in the rate will decrease Expenditure. On the other hand, I shall emphasise the decreases (or increases) in Expenditure which are caused by a fall (or rise) in the price of consumption goods, by a decrease (or increase) in Individuals' Incomes or by a redistribution of incomes such that a larger (or smaller) proportion goes to the rich.

In order that equilibrium should be maintained, any net increase (or decrease) in Investment and an exactly equivalent net decrease (or increase) in Expenditure must take place at the same time. Such changes would, however, alter the size and distribution of Individuals' Incomes and the price of consumption goods, all of which are factors altering the amount of Expenditure which will be undertaken at any given rate of interest. What will happen to the size and distribution of Individuals' Incomes and to the price of consumption goods, consequent upon any given change of this kind, will depend upon the short-period elasticity of supply of Capital goods and of Consumption goods.

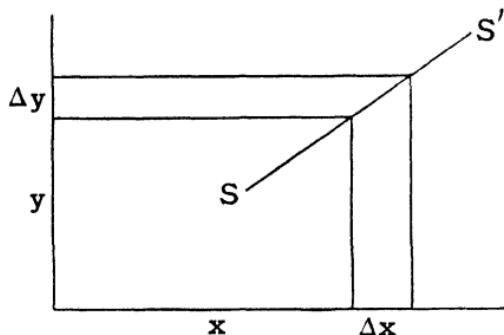
To discuss the main factors determining this problem, I wish for the moment to make certain very severe assumptions. Let us for the moment assume: (1) that there is perfect competition so that the market price of every product equals its marginal prime cost; (2) that there is only one industry producing capital goods, the product of which industry is used for every purpose for which fixed capital is used; (3) that the money wage-rate is fixed; (4) that

the raw materials used in the production of consumption goods cannot possibly be used in the production of fixed capital goods, while the raw material used for producing fixed capital goods cannot be used for producing consumption goods. In these circumstances it would be possible to draw a short-period supply curve of consumption goods, being a curve representing the marginal prime cost of consumption goods, and a short-period supply curve of fixed capital goods, being a curve representing the marginal prime cost of fixed capital goods. The marginal prime cost of consumption goods will represent the increase in the amount which must be paid to hire more labour and to purchase more raw materials to produce the last unit of consumption goods; but, since the marginal prime cost, and so the price of the raw material, will be represented by the amount which must be paid to hire more labour to produce the last unit of these raw materials, the marginal prime cost of consumption goods will be equal to the addition to the wage bill in consumption industry and in the industry producing its raw materials, which is due to the production of the last unit of consumption goods. Similarly the marginal prime cost of fixed capital goods may be reduced to the addition to wages necessary in fixed-capital industry and the industry producing its raw materials, in order to produce the last unit of fixed-capital goods.¹

In the accompanying diagram S—S¹ represents the short-period supply curve of consumption goods,

¹ This argument assumes that the rate of interest on working capital and variations in depreciation of fixed capital, due to variations in short-period output, are negligible factors in prime costs.

where x is the output and y the price or marginal prime cost. Let e represent the elasticity of supply of consumption goods. Then e by definition $= \frac{\Delta x/x}{\Delta y/y} = \frac{y\Delta x}{x\Delta y}$. Let there be a given increase, A , in expenditure on consumption goods, so that $A = y\Delta x + x\Delta y$, where $y\Delta x$ is the consequent increase in prime costs and $x\Delta y$ the consequent increase in prime profits. Let a proportion l of the increase in



expenditure go to prime profits, so that $lA = x\Delta y$ and $(1 - l)A = y\Delta x$. Then since $e = \frac{y\Delta x}{x\Delta y}$, and since $y\Delta x = (1 - l)A$ and $x\Delta y = lA$, $e = \frac{1-l}{l}$, or $l = \frac{1}{1+e}$ and $1-l = \frac{e}{1+e}$. Thus any increase (or decrease) A in expenditure on consumption goods would cause an increase (or decrease) of $\frac{1}{1+e}A$ in prime profits and an increase (or decrease) of $\frac{e}{1+e}A$ in prime costs (*i.e.* in wages). Similarly it may be shown that, where η was the short-period elasticity

of supply of fixed-capital goods, a decrease (or increase) A in expenditure on such goods would cause a decrease (or increase) of $\frac{1}{1+\eta}A$ in prime profits and of $\frac{\eta}{1+\eta}A$ in prime costs (*i.e.* in wages).

Any change, in which equilibrium is maintained, involves that an increase (or decrease) A in Expenditure should be associated with a decrease (or increase) A in Investment. Thus an increase A in Expenditure will cause an increase $\frac{1}{1+e}A$ in prime profits and an increase $\frac{e}{1+e}A$ in prime costs in consumption industry, and will be associated with a decrease $\frac{1}{1+\eta}A$ in prime profits and a decrease $\frac{\eta}{1+\eta}A$ in prime costs in capital-producing industry. The increase A in Expenditure will therefore be associated with an increase $\left(\frac{1}{1+e} - \frac{1}{1+\eta}\right)A$ or $\frac{\eta-e}{(1+e)(1+\eta)}A$ in prime profits in the economy as a whole, together with a decrease of the same amount $\left(\frac{\eta}{1+\eta} - \frac{e}{1+e}\right)A$ or $\frac{\eta-e}{(1+e)(1+\eta)}A$ in prime costs. Thus such a change will cause a transference of constant Final Incomes from wages to other Final Incomes of $\frac{\eta-e}{(1+e)(1+\eta)}A$, which quantity is +ve, if η is $> e$. $\frac{\eta-e}{(1+e)(1+\eta)} \left[= \left(\frac{1}{1+e} - \frac{1}{1+\eta}\right)A \right]$ is greater, the greater is η and the less is e . In this

case, then, the transference of Final Incomes from wages to other incomes will be greater or the transference from other incomes to wages will be less, the greater is the elasticity of supply of capital goods and the less the elasticity of supply of consumption goods.

Conversely, a decrease in Expenditure of A, if equilibrium is maintained, will cause a transference of constant Final Incomes of $\frac{e - \eta}{(1 + e)(1 + \eta)}$ from wages to other incomes, which quantity is $+ve$, if $e > \eta$. $\frac{e - \eta}{(1 + e)(1 + \eta)}$ A is greater, the greater is e and the less is η . In this case the transference from wages to other incomes will be greater or the transference from other incomes to wages will be less, the greater is the elasticity of supply of consumption goods and the less is the elasticity of supply of capital goods.

A transference of Final Incomes from wages to other incomes will cause a decrease in Expenditure, and a transference from other incomes to wages will cause an increase in Expenditure for two reasons. (1) In the first place, a transference of Final Incomes from wages to other incomes will cause a fall in Individuals' Incomes. We have seen (p. 10) that Final Incomes = Individuals' Incomes + Budget Surplus + Increase in Companies' Reserves + replacement cost of previous periods' depreciation - allowance for non-replaceable depreciation of the period. A transference of Final Incomes from wages to Net Profits will almost certainly to some extent increase the rate of increase of Companies' Reserves. It will also increase the

Budget Surplus, if the rate of taxation on Net Profits, whether levied directly on the company or on the profits distributed by the company, is higher than the rate of tax levied on wages, which is almost certain to be the case with a progressive tax system. Thus a transference of constant Final Incomes from wages to other incomes would decrease Individuals' Incomes and so discourage Expenditure. (2) But secondly, in so far as a transference of Final Incomes from wages to other incomes simply means a transference of Individuals' Incomes from wage-earners to other individuals, it will mean a transference from the poorer to the richer members of the community and will therefore discourage Expenditure (*v. above*, p. 58).

At the same time, the rise in the price of consumption goods following an increase A in Expenditure, or the fall following a decrease A in Expenditure, will be greater, the less is e , the elasticity of the short-period supply of consumption goods.¹

We may therefore make the following conclusions from the previous arguments of this chapter. (1) In the case in which any change occurs, in which there is a net increase in Expenditure with a similar

¹ Using the notation of the diagram on p. 62, the rise in price caused by an increase A in Expenditure = $\frac{\Delta y}{y}$, which is equal to $\frac{\Delta x}{x} \cdot \frac{1}{e}$, since $e = \frac{\Delta x/x}{\Delta y/y}$. $A = x\Delta y + y\Delta x$, so that $\Delta x = \frac{A - x\Delta y}{y}$. It follows that $\frac{\Delta y}{y} = \frac{A - x\Delta y}{xy} \cdot \frac{1}{e}$, so that $\Delta y = \frac{A}{x(1+e)}$. $\therefore \frac{\Delta y}{y}$, the rise in price, = $\frac{A}{xy} \cdot \frac{1}{1+e}$, where $\frac{A}{xy}$ represents the proportionate increase in Expenditure, and e represents the elasticity of supply of consumption goods.

net decrease in Investment, (a) Expenditure will be encouraged by the rise in the price of consumption goods which this entails; and this encouragement to Expenditure will be greater, the less is e , since the rise in price will be greater, the less is e ; (b) Expenditure will be further encouraged if e is $> \eta$, in so far as this will cause a transference of incomes from other incomes to wages; but will be discouraged if e is $< \eta$, in so far as this entails a transference of income from wages to other incomes. It follows that Expenditure will be more encouraged, the less is η ; in so far as the rise in price of consumption goods will be greater, Expenditure will be more encouraged, the less is e ; but in so far as the transference from wages to other incomes will be less or the transference from other incomes to wages will be greater, Expenditure will be more encouraged, the greater is e . (2) In the case of a decrease in Expenditure associated with a similar increase in Investment, (a) Expenditure will be discouraged by the fall in price of consumption goods which this entails; and the discouragement to Expenditure will be greater, the less is e ; (b) Expenditure will be further discouraged if e is $> \eta$, since this will in this case cause a transference of the constant Final Incomes from wages to other incomes, but will be encouraged if e is $< \eta$, in so far as this entails a transference of income from other incomes to wages. It follows that Expenditure will be more discouraged, the less is η ; in so far as the price of consumption goods will be lower, Expenditure will be more discouraged, the less is e , but in so far as the transference from other incomes to wages will be greater or the transference

from wages to other incomes less, Expenditure will be more encouraged, the less is e .

I do not wish to assume in the next chapters, in which these conclusions will be used, that the structure and conditions of the productive system of the economy are anything like so simple as I have assumed here. I shall simply assume that the main determinant of the extent of the rise in price of consumption goods, consequent upon a given increase in expenditure on them, is the technical possibility of increasing their supply in the short period, or, in other words, their short-period elasticity of supply. And I shall argue, therefore, on the assumption that the greater the short-period elasticity of supply of consumption goods, understood in this sense, and the less the short-period elasticity of supply of capital goods, understood in a similar sense, the less will be the rise (or fall) in the price of consumption goods and the less (or greater) the transference of incomes from wages to other incomes, or the greater (or less) the transference from other incomes to wages, which will follow upon any given increase (or decrease) in Expenditure associated with an equivalent decrease (or increase) in Investment.

VII

THE STRUCTURE OF THE PRODUCTIVE SYSTEM AND THE MAINTENANCE OF EQUILIBRIUM

In this chapter I shall discuss certain aspects of the productive system which will influence the effect of changes in the rate of interest on Investment. These considerations arise chiefly from the fact that the firms producing fixed-capital goods do not constitute one single homogeneous industry producing capital goods for all the purposes for which such goods may be required. One industry produces capital goods, which are used as fixed capital by another industry, which itself produces capital goods for other purposes.

For this purpose let us regard capital-producing industries as being ranged in a series A, B, C, . . . X, Y, Z, industry A producing goods *a*, which are used as fixed capital to produce consumption goods, industry B producing goods *b*, which are used as fixed capital in A, industry C producing goods *c*, which are used as fixed capital in B, and so on.¹

The maintenance of equilibrium demands that any given decrease in Expenditure should be associated at the same time with an exactly equivalent

¹ In fact the structure of industry is not nearly as simple as this. There may be many "circular" relationships between different industries. Thus while E supplies capital for D, D for C, C for B and B for A, C may also be supplying some capital for D, and B, as well as supplying A, might supply all or some of E's capital. However, the simple structure examined in the text brings to light the most important considerations.

increase in Investment. This does not, however, mean that the amount spent on every capital good a to z must increase. The amount spent on goods a to m may actually fall, so long as the amount spent on goods n to z so increases as to counterbalance the decrease in Expenditure and the decrease in the amount spent on products a to m . Conversely, if there is an increase in Expenditure together with a similar decrease in Investment, the amount spent on products a to m may actually increase, so long as the decrease in the amount spent on products n to z is great enough to counterbalance not only the increase in the amount spent on products a to m , but also the increase in Expenditure. I shall talk of industry N as being the lowest industry in the scale of capital-producing industries, on the product of which more (or less) is spent, when there is an increase (or decrease) in Investment associated with an equivalent decrease (or increase) in Expenditure.¹ Industries A to M are called industries of the lower stages, and industries N to Z industries of the higher stages.

An increase in Expenditure itself will increase, and a decrease in Expenditure will decrease, the incentive to Investment. An increase of a certain amount of Expenditure will raise the price of consumption goods, and it will therefore increase the Average Rate of Net Profits and will raise the curve of the Marginal Rate of Net Profits of every firm.

¹ Industry N may, of course, in any particular circumstances be as low in the scale as industry A; for the maintenance of equilibrium may involve that an increase (or decrease) in Expenditure can only be balanced by an equivalent decrease (or increase) in Investment, if there is a decrease (or increase) in the amount spent on every product a to z .

The less elastic the supply of consumption goods, the higher will their price rise following a given increase in Expenditure, and therefore the greater will be the rise in the Average Rate of Net Profits,¹ and the rise in the curve of the Marginal Rate of Net Profits. It follows that a given increase in Expenditure will cause a greater incentive to Investment, the less elastic is the supply of consumption goods. Conversely, a given decrease in Expenditure is an incentive to decrease Investment, and will cause a greater incentive to decrease Investment, the less elastic the supply of consumption goods.

If there is a sudden decrease in Expenditure at the current rate of interest and prices of consumption goods, then to maintain equilibrium there must be an equivalent increase in Investment; and in order that this should occur there must be a fall in the rate of interest, which will stimulate Investment and restimulate Expenditure.² In the new equilibrium the rate of interest will be lower, Investment will be greater and Expenditure will be less than in the old equilibrium, but not so much less as it would have been had the rate of interest not fallen. Expenditure on consumption goods will be less, and expenditure on commodities *a* to *m* for Investment will be less, while expenditure on commodities *n* to *z* for Investment purposes will be increased by an amount equal to the decrease in Expenditure + the decrease in expenditure on commodities *a* to *m*. The fall in Expenditure will

¹ The less the elasticity of supply of consumption goods, the greater will be the proportion of the increased Expenditure which goes to Prime Profits and so the greater the rise in Net Profits.

² We are assuming that a fall in the rate of interest decreases Savings and *vice versa* (*v. above*, p. 60).

cause a fall in Net Profits in consumption industry, and this will lead to a decrease in expenditure on *a* for Investment. But the decrease in expenditure on *a* will be less than it would have been had the rate of interest not fallen, since the fall in the rate will stimulate Investment by consumption industries again. The fall in expenditure on *a* will diminish Net Profits in A, and this will lead to a fall in expenditure on *b*. However, the fall in expenditure on *b* will be less than it would have been had the rate of interest not fallen, both because the fall in expenditure on *a* and so in Net Profits in A will be lessened by a fall in the rate of interest, and because a given fall in Net Profits in A will cause a smaller decrease in expenditure on *b*, if the rate of interest has fallen. At some point in the system, viz. in industry M, the decrease in the amount spent on *m* will be small and the fall in the rate of interest will more than counterbalance the fall in Net Profits in M, and more will be spent on *n* than before. Industry N will spend more on *o* for two reasons, both because more is spent on *n*, so that Net Profits are raised in N, and because the rate of interest has fallen; these repercussions will then spread up the system from N to Z.

In the case which we are examining, equilibrium demands that there should be some net increase in Investment and decrease in Expenditure. *Ceteris paribus*, this can be brought about with a smaller fall in the rate of interest, the more elastic is the supply of consumption goods, in so far as the more this is so, the less will be the fall in Net Profits in consumption industry and the less therefore the incentive to decrease Investment, which would

otherwise spread up the system, and which must be counterbalanced by a fall in the rate of interest. It is less easy to say anything definite in this connection about the short-period elasticity of supply of capital industries A to M and N to Z. We have seen above (*v. Chapter IV*, p. 46) that a firm or industry will certainly be induced to buy more additional capital goods for Investment purposes the lower is the price of those goods, but that it might, however, spend less or more money on Investment if the price fell; in the first case we may say that its demand for capital goods is inelastic, and in the second case elastic. We have discussed, in the chapter referred to above, the conditions which make it likely whether a firm or industry's demand for capital goods will be inelastic or elastic. If the demand of consumption industry and of industries A to L for their respective capital goods is inelastic, then it is certain that the more elastic the supply in industries A to M, the less the rate of interest need fall to maintain equilibrium. For in the first place the more elastic their supply, the less will the price of the product of any one of the industries A to M fall with a given fall in the amount spent on it, and, since the demand for it is inelastic, the less its price falls the less necessary would it be to re-stimulate the demand for it by a fall in the rate of interest. But in the second place, the more elastic its supply, the less will its Net Profits fall with a given fall in the amount spent on it; and therefore its demand for its capital goods will need less re-stimulation by a fall in the rate of interest, the more elastic is its short-period supply. If, however, the demand of consumption industry and of in-

dustries A to L for their respective capital goods is elastic, these two considerations will work against one another. In the first place, the less elastic the supply in industries A to M, the more the price of the product would fall consequent upon any decrease in the amount spent on it; but the more the price fell in this case, the more this would restimulate expenditure on it, since the demand for it is elastic. In the second place, however, the more elastic its supply, the less would be the fall in its Net Profits consequent upon any decrease in expenditure on it, and therefore the less need the rate of interest fall to restimulate its demand for capital goods to a certain amount. These two considerations will be working against one another.

In the case which we are discussing, in which a decrease in Expenditure, together with a sufficient fall in the rate of interest, is accompanied by an equivalent increase in Investment, expenditure on products n to z will be increased. If the demands of industries M to Y for products n to z are inelastic, then the less the elasticities of supply of industries N to Z, the smaller must be the fall in the rate of interest to maintain equilibrium. For in this case the higher the prices of products n to z rise with any increases in the amount spent on them, the less the rate of interest need fall to stimulate a certain increase in expenditure on them, since the demand for them is inelastic. And in the second place, the less their elasticities of supply, the greater the rise in Net Profits in any one of these industries consequent upon a given increase in the amount spent on its product, and therefore the less the rate of interest need fall to

stimulate an increase in its Investment in capital goods by a certain amount. But if the demand of industries M to Y for commodities n to z is elastic, these considerations work against one another. In the first place, the less elastic their supply, the greater will be the rise in their prices consequent upon a given increase in the amount spent on them, and the greater must be the fall in the rate of interest necessary to induce a given increase in expenditure on them, since the demand for them is elastic. But in the second place, the less elastic is their supply, the greater will be the increase in their Net Profits following any increase in expenditure on them, and the less therefore need the rate of interest fall to stimulate a given increase in their Investment in capital goods.

In the case in which equilibrium is disturbed by a sudden increase in Expenditure, equilibrium can only be maintained by such a rise in the rate of interest in the new equilibrium that Investment and Expenditure are discouraged; in the new equilibrium the rate of interest will be higher, Investment will be less and Expenditure will be greater by a certain amount. In this case expenditure on capital goods a to m for Investment purposes will probably be greater after the change, and expenditure on capital goods n to z will be less by the amount of the increase in Expenditure + the increase in expenditure on goods a to m for Investment purposes. The increase in Expenditure will raise Net Profits in consumption industry, and this will induce an increase in expenditure on a . The increase in expenditure on a will be less than it would otherwise have been, because the rate of

interest has risen. The increase in expenditure on *a* will raise Net Profits in A, and this will induce an increase in expenditure on *b*. The increase in expenditure on *b* will be less than it would have been, if the rate of interest had not risen, both because the rise in the rate will lessen the increase in expenditure on *a* and so the rise in Net Profits in A, and also because any given rise in Net Profits in A will induce a smaller increase in expenditure on *b*, because the rate of interest has risen. In industry M the rise in the rate of interest out-balances the rise in Net Profits and there is a decrease in expenditure on *n*. Industry N spends less on *o*, both because Net Profits in N are less, and because the rate of interest has risen.

The rate of interest need rise less in order to induce a certain decrease in Investment, the more elastic is the supply of consumption goods. For the more elastic is their supply, the less will be the rise in Net Profits in consumption industry due to a given increase in Expenditure, and the less therefore will be the increased inducement to Invest, which must be overcome by the rise in the rate of interest. In the case in which the demand of consumption industry and of Industries A to L for commodities *a* to *m* is inelastic, it is certain that the more elastic the supply in industries A to M, the less need the rate of interest rise to induce a certain net decrease in Investment. For in the first place, the more elastic the supply, the less will Net Profits in any one of these industries rise, consequent upon a given increase in expenditure on its product, and therefore the rate of interest need rise less to discourage any consequent increase in

expenditure on capital goods; and in the second place, since the demand for its product is inelastic, the less the price of its product rises with every increase in expenditure on it, the smaller will be the incentive to increase Investment, which must be offset by the rise in the rate of interest. If the demand of consumption industry and of industries A to L for commodities *a* to *m* is elastic, these two considerations will work against one another. In the first place, the more elastic their supply, the less would be the rise in Net Profits, following any increase in the amount spent on the product of any one of them; but also the more elastic their supply the less would their price rise and so the incentive to Invest would be greater, since the demand for them is elastic. In the case in which the demand of industries M to Y for products *n* to *z* is inelastic, it is certain that the rate of interest need rise less to induce a certain net decrease in Investment, the less elastic is the supply in industries N to Z. For Net Profits will fall more, the less elastic is their supply; and also their price and therefore, since the demand for them is inelastic, the incentive to expenditure on them for Investment purposes will be less, the less elastic is their supply. But if the demand for them is elastic, the less elastic is their supply, the less will the incentive to spend money on them for Investment fall, and, in so far as this is the case, the more must the rate of interest rise to induce a certain net decrease in Investment.

In the case in which equilibrium is disturbed by a rise in Investment, the rate of interest must rise. This will induce some decrease in Expenditure and also diminish the net increase in Investment. The

rise in the rate of interest need be less in order to diminish the increase in Investment by a certain amount, the less elastic is the supply of consumption goods; for the less elastic the supply of consumption goods the greater will be the fall in Net Profits in consumption industry, and therefore the greater the incentive to diminish Investment because of any given decrease in Expenditure. The expenditure on certain capital goods for Investment purposes in the new equilibrium may actually be less in the new equilibrium, and on other capital goods will be more in the new equilibrium. But in this case it is not certain that there will be a diminished expenditure on products a to m and an increased expenditure for Investment on products n to z . Thus if the increase in Investment, e.g. because of some invention which caused the primary disturbance to equilibrium, took the form of an increase in expenditure for Investment on the part of industry A on product b , there would be an increase in expenditure for Investment on products b to m and a decrease in expenditure for Investment on products a and n to z . The decrease in Expenditure and the rise in the rate of interest would mean that there was a decrease in expenditure on a by consumption industry. The increase in expenditure by industry A on b would be diminished both by the fall in expenditure on a and also by the rise in the rate of interest. Industry B would spend more for Investment on c , but would not spend so much more on c as it would have done had the rate not risen, both because the increase in expenditure on b will be diminished and also because the rise in the rate will mean that any given increase in

expenditure on *b* will cause a smaller increase in expenditure by *B* on *c*. In industry *M* the rise in the rate of interest will outweigh the increase in expenditure on *m* and less will be spent on *n* than before. *N* will then spend less on *o*, both because the amount spent on *n* has fallen and also because the rate of interest has risen.

In this case the rate of interest need certainly rise less to discourage Investment, the more elastic is the supply of those capital industries expenditure on which is greater in the new equilibrium, if the demand for the products of these industries is inelastic. For in any case any given increase in expenditure on the product of any one of them will cause a smaller rise in Net Profits in that industry, the more elastic is its supply; and also, since its price will rise less, the more elastic is its supply, and since in this case the demand for it is inelastic, the inducement to expenditure on it will be smaller, the more elastic is its supply. If, however, the demand for its product is elastic, the inducement to expenditure on it will be greater, the more elastic its supply and the less quickly its price rises; and in so far as this is the case, there must be a greater rise in the rate of interest to discourage Investment, the more elastic is the supply of these products. The rate of interest need rise less to discourage Investment, the less elastic is the supply of those capital products expenditure on which is less in the new equilibrium, provided that the demand for these products is inelastic. In any case the less elastic is their supply, the greater will be the fall in Net Profits following any decrease in expenditure on any one of them. Moreover, the less elastic is the

supply of any one of them, the greater will be the fall in the price of its product: in the case, then, in which the demand for it is inelastic, the discouragement to Investment in the form of expenditure on it will be greater, the less elastic is its supply; but if the demand for it is elastic, the discouragement to expenditure on it will be greater, the more elastic its supply.

If equilibrium is disturbed by a decrease in Investment, the rate of interest must fall to encourage Investment again and to discourage Savings and so encourage Expenditure. In the new equilibrium Expenditure will be greater, Investment less and the rate of interest lower. The expenditure on certain capital products for Investment will be less and the expenditure on others for Investment will be greater after the change, but we cannot say whether expenditure for Investment purposes will actually increase in the lower stages, since this depends upon whether the primary decrease in Investment, which changed the equilibrium, occurred in the higher or lower stages. But in this case the less elastic the supply of consumption goods, the less the rate of interest need fall to encourage Investment by a certain amount again. For the less elastic the supply of consumption goods, the greater the increase in Net Profits in consumption industry consequent upon any increase in Expenditure, and therefore the greater the encouragement to Investment caused by any increase in Expenditure. The rate of interest need fall less to encourage Investment, the more elastic is the supply of those capital goods, expenditure on which has decreased, provided that the demand for them is inelastic. For in

any case the more elastic their supply, the less will be the fall in Net Profits consequent upon a given decrease in expenditure on them. In the case in which the demand for them is inelastic, the inducement to spend on them will be greater, the more elastic their supply and the higher their price remains; but if the demand for them is elastic, the inducement to spend on them would be greater, the less elastic their supply and the more their price fell. Again, the rate of interest need fall less to maintain equilibrium, the less elastic is the supply of those capital products expenditure on which is greater in the new equilibrium, provided that the demand for them is inelastic. For in any case Net Profits will rise more in these industries consequent upon a given increase in expenditure on them, the less elastic is their supply. Their price will also rise more, consequent upon a given increase in expenditure on them, the less elastic is their supply. If the demand for them is inelastic, the rate of interest need fall less to encourage a given increase in expenditure on them, the more their price rises or the less their elasticity of supply; but if the demand for them is elastic, the rate need fall less to encourage a given increase in expenditure on them, the less their price rises or the greater their elasticity of supply.

VIII

SUMMARY OF CONCLUSIONS OF CHAPTERS IV TO VII

EQUILIBRIUM may be disturbed in four ways: (1) by a decision on the part of individuals to decrease Expenditure at the current rate of interest and price of consumption goods, (2) by a decision on the part of individuals to increase Expenditure, (3) by a decision to Invest more at current prices and the current rate of interest, and (4) by a decision to Invest less. This chapter will summarise the different conditions which determine how much the rate of interest must rise or fall in each of these four cases to maintain equilibrium.

(1) In the case in which there is a sudden decision to decrease Expenditure, the rate of interest must fall. It must fall until it has so encouraged Investment and Expenditure again that the net decrease in Expenditure is equal to the net increase in Investment. There will then, in the new equilibrium, be a certain increase in Investment and a certain decrease in Expenditure.

Let us first examine the conditions which determine how much the rate of interest must fall to give an incentive for this given increase in Investment. The rate need fall less to give an incentive to Investment:

(a) the more sensitive Investment is to a fall in

the rate of interest for the reasons discussed in Chapter IV, *i.e.* the greater are the possibilities of substituting capital for other factors of production; the less are the disadvantages of a growth in the size of the firm; the more perfect is competition; the greater the number of firms which before the change just found it not worth while replacing their capital; the greater the number of industries in which the highest point on the curve of the Average Rate of Net Profits of the representative firm was just below the market rate of interest before the change; and the greater the number of new processes which before the change were just on the borderline of profitability;

(b) the more elastic is the supply of consumption goods, in so far as the fall in Net Profits in consumption industry will be the less, and the consequent incentive to decrease Investment less;

(c) the more elastic is the supply of commodities a to m , in as far as the decrease in expenditure on these commodities will cause a smaller fall in Net Profits in industries A to M;

(d) the more elastic is the supply of commodities a to m , if the demand for them is inelastic, in as far as the decrease in their price and therefore the incentive to decrease expenditure on them will be the less;

(e) the less elastic is the supply of commodities a to m , if the demand for them is elastic, in as far as the decrease in their price will be the more and therefore the incentive to decrease expenditure on them the less;

(f) the less elastic is the supply of commodities n to z , in as far as the rise in Net Profits will be greater in industries N to Z;

(g) the less elastic is the supply of commodities n to z , if the demand for them is inelastic, in as far as the rise in their price and therefore the incentive to increase expenditure on them will be the more;

(h) the more elastic is the supply of commodities n to z , if the demand for them is elastic, in as far as the rise in their price will be the less and the incentive to increase expenditure on them the more.

There will also in this case be a decrease in Expenditure. The rate of interest need fall less to give an encouragement to Expenditure:

(a) the more Expenditure is encouraged simply by a fall in the rate of interest;

(b) the more elastic the supply of consumption goods, in as far as their price will fall the less and the incentive to Expenditure will be the greater;

(c) the less elastic the supply of consumption goods and of commodities a to m , and the more elastic the supply of commodities n to z , in as far as the transference of incomes from wages to other incomes will be the less or the transference from other incomes to wages the greater.

(2) In the case in which equilibrium is disturbed by a decision to increase Expenditure, the rate of interest must rise, so as to discourage Investment and Expenditure, so that the net increase in Expenditure is equal to the net decrease in Invest-

ment. There will in the new equilibrium be a certain decrease in Investment and increase in Expenditure; and the rate of interest need rise less to cause this decrease in Investment:

- (a) the more sensitive Investment is to changes in the rate of interest for reasons discussed in Chapter IV;
- (b) the more elastic is the supply of consumption goods, in as far as the rise in Net Profits in consumption industry and the consequent incentive to increase Investment will be the less;
- (c) the more elastic is the supply of commodities a to m , in as far as the rise in Net Profits in industries A to M will be the less;
- (d) the more elastic is the supply of commodities a to m , if the demand for them is inelastic, in as far as the rise in their price and therefore the incentive to increase expenditure on them will be the less;
- (e) the less elastic is the supply of commodities a to m , if the demand for them is elastic, in as far as the rise in their price will be the greater and the incentive to increase expenditure on them therefore the less;
- (f) the less elastic is the supply of commodities n to z , in as far as the fall in Net Profits will be the greater in industries N to Z;
- (g) the less elastic is the supply of commodities n to z , if the demand for them is inelastic, in as far as the fall in their price and therefore the incentive to decrease expenditure on them will be the greater;

(h) the more elastic is the supply of commodities n to z , if the demand for them is elastic, in as far as the fall in their price will be the less and therefore the incentive to decrease expenditure on them the greater.

There will in this case be some increase in Expenditure. The rate of interest need rise less in order to discourage Expenditure to a certain extent:

(a) the more Expenditure is discouraged simply by a rise in the rate of interest;

(b) the more elastic the supply of consumption goods, in as far as their price will rise the less and the incentive to Expenditure will be less;

(c) the less elastic the supply of consumption goods and of commodities a to m , and the more elastic the supply of commodities n to z , in as far as the transference of incomes from other incomes to wages will be the less or the transference from wages to other incomes the greater.

(3) In the case in which equilibrium is disturbed by an increase in Investment, the rate of interest must rise in order so to discourage Investment and Expenditure that the net increase in Investment is equal to the net decrease in Expenditure. In the new equilibrium Investment will be greater and Expenditure less.¹ The rate of interest need rise less to discourage Investment by a certain amount:

¹ This is only true on the assumption, which is being made, that a rise in the rate of interest discourages Expenditure. If Expenditure is unaltered by a change in the rate of interest, then in the new equilibrium there will be no change in Expenditure or in Investment, and the rate of interest must simply rise

(a) the more Investment is discouraged by a rise in the rate of interest for the reasons discussed in Chapter IV;

(b) the less elastic is the supply of consumption goods, in as far as the fall in Net Profits in consumption industry will be the greater and therefore the incentive to Investment will be the less;

(c) the less elastic is the supply of those capital goods expenditure on which is less in the new equilibrium, in as far as the fall in Net Profits in these industries will be the greater;

(d) the less elastic is the supply of those capital goods expenditure on which is less in the new equilibrium, if the demand for these goods is inelastic, in as far as the fall in their price and therefore the incentive to decrease expenditure on them will be greater;

(e) the more elastic is the supply of those capital goods expenditure on which is less in the new equilibrium, if the demand for these goods is elastic, in as far as the fall in their price and therefore the incentive to spend on them will be less;

(f) the more elastic is the supply of those capital goods expenditure on which is greater in the new equilibrium, in as far as the rise in Net Profits in these industries will be the less;

until Investment has returned to its old level. If a rise in the rate of interest encouraged Expenditure, then the rate would have to rise, until Investment was so lessened as to be actually less than it was before the change. In the new equilibrium Expenditure would be greater, Investment less and the rate of interest would be higher. All the conditions discussed above under (1), the case of a disturbance to equilibrium caused by an increase in Expenditure, would be relevant in this case.

(g) the more elastic is the supply of those capital goods expenditure on which is greater in the new equilibrium, if the demand for them is inelastic, in as far as the rise in their price and therefore the incentive to increase expenditure on them will be the less;

(h) the less elastic is the supply of those capital goods expenditure on which is greater in the new equilibrium, if the demand for them is elastic, in as far as the rise in their price will be the greater and therefore the incentive to increase expenditure on them the less.

In this case there will also be some decrease in Expenditure. This can be brought about by a smaller rise in the rate of interest:

(a) the more Expenditure is decreased directly by a rise in the rate of interest;

(b) the less elastic the supply of consumption goods, in as far as the fall in their price and therefore the incentive to decrease Expenditure will be the greater;

(c) the more elastic the supply of consumption goods and of those capital goods expenditure on which is less in the new equilibrium, and the less elastic the supply of those capital goods expenditure on which is greater in the new equilibrium, in as far as the transference of incomes from wages to other incomes will be the greater or the transference from other incomes to wages the less.

(4) In the case in which equilibrium is disturbed by a decrease in Investment, the rate of interest

must fall, in order so to encourage Investment and Expenditure that the net decrease in Investment is equal to the net increase in Expenditure. In the new equilibrium the rate of interest will be lower; Investment will be less by a certain amount and Expenditure will be so much the greater.¹ The rate of interest need fall less to increase Investment again by a certain amount:

- (a) the more Investment is increased by a fall in the rate of interest for the reasons discussed in Chapter IV;
- (b) the less elastic the supply of consumption goods, in as far as the rise in Net Profits in consumption industry will be the greater;
- (c) the less elastic is the supply of those capital goods expenditure on which is greater in the new equilibrium, in as far as the rise in Net Profits in these industries will be the greater;
- (d) the less elastic is the supply of those capital goods expenditure on which is greater in the new equilibrium, if the demand for these goods is inelastic, in as far as the rise in their price and therefore the incentive to increase expenditure on them will be the greater;
- (e) the more elastic is the supply of those capital

¹ If Expenditure is unaltered by a fall in the rate of interest, the rate must fall until Investment is so encouraged that it remains unaltered. If a fall in the rate of interest actually discourages Expenditure, then the rate must fall until Investment is so increased again that it is greater in the new equilibrium. In the new equilibrium Expenditure will be less. All the conditions discussed under (2), the case of a disturbance to equilibrium caused by a decrease in Expenditure, would be relevant in this case.

goods expenditure on which is greater in the new equilibrium, if the demand for them is elastic, in as far as the rise in their price will be the less and therefore the incentive to increase expenditure on them will be the more;

(f) the more elastic is the supply of those capital goods expenditure on which is less in the new equilibrium, in as far as the fall in Net Profits in these industries will be the less;

(g) the more elastic is the supply of those capital goods expenditure on which is less in the new equilibrium, if the demand for them is inelastic, in as far as the fall in their price and therefore the incentive to decrease expenditure on them will be the less;

(h) the less elastic is the supply of those capital goods expenditure on which is less in the new equilibrium, if the demand for them is elastic, in as far as the fall in their price will be the greater and therefore the incentive to decrease expenditure on them the less.

In this case there will also be some increase in Expenditure in the new equilibrium. This increase in Expenditure can be brought about with a smaller fall in the rate of interest:

(a) the more Expenditure is increased directly by a fall in the rate of interest;

(b) the less elastic the supply of consumption goods, since the rise in their price and therefore the incentive to increase Expenditure will be the greater;

(c) the more elastic the supply of consumption goods and of those capital goods expenditure on which is greater in the new equilibrium, and the less elastic the supply of those capital goods expenditure on which is less in the new equilibrium, in as far as the transference of incomes from other incomes to wages will be the greater or the transference from wages to other incomes will be the less.

IX

DISCONTINUITIES IN INVESTMENT AND EXPENDITURE

WE have already discussed the criterion of equilibrium in a progressive society, and have seen how equilibrium may be disturbed by sudden changes in Investment or in Expenditure, and have examined the conditions which determine what change in the equilibrium rate of interest is necessitated by any given change in Expenditure or Investment. In this chapter I wish simply to enumerate the main reasons why in a progressive society we must expect discontinuities in Investment and Expenditure.

The progressive society, which we are studying, is one in which inventions are taking place and in which capital is being accumulated. Even although we have assumed that the population is constant, output will increase both because inventions take place by means of which a greater output can be obtained with a given amount of the factors of production, and also because, as capital accumulates, a constant amount of labour will produce a larger output. We may divide the causes which lead to discontinuities in economic progress under five heads: (1) causes connected with the invention of new processes, (2) causes connected with the length of life of fixed capital goods or durable consumption goods, (3) causes connected with "increasing returns", due to the absolute increase in output, (4) causes connected

with Public Finance, and (5) causes connected with a change in the Market Rate of Interest.¹

(1) Important inventions of new methods and processes are likely to be made in a discontinuous manner at different times and with rather arbitrary intervals of time between them. Most—though not all—inventions are likely to lead to an increase in Investment at the current rate of interest, whether they are from the long-period point of view labour-saving or capital-saving. For most inventions are likely to require an alteration in the form of the fixed capital employed, whether in the end at the given rate of interest, wage-rate and prices they would lead to an increase or a decrease in the proportion of capital to labour employed. They are likely, therefore, to lead to a considerable increase in Investment at the current rate of interest, since all competitors will attempt to install the new form of fixed capital as quickly as possible to obtain a competitive advantage.

Inventions may, however, be of a second type, and may take the form of the discovery of new methods of producing goods,—whether raw materials, fixed - capital goods or consumption goods,—at a lower prime cost without any alteration in the form or the amount of fixed capital used to produce them. In the same class must be included changes in the “bounty of nature” in harvests, which in the same way cause sudden changes in the prime costs of producing certain raw materials or con-

¹ This list is not exhaustive; for instance, it does not cover an autonomous decision on the part of individuals to change the amount of their Expenditure and Savings; but it covers the most important causes of discontinuity in Expenditure and Investment.

sumption goods, without the necessity of any alteration in the amount or form of the fixed capital employed. Also in this same class must be included the further effects of inventions of the type which was mentioned in the preceding paragraph. For as soon as the necessary capital has been installed so as to change the form of the fixed capital employed, there will follow a rather sudden fall in the prime costs, and so in the price of the article being produced. What I wish to discuss generally in this class is the effect of changes in the bounty of nature or of the inventions which either directly or indirectly cause a sharp fall in the short-period cost, and so in the price of certain commodities.

If the price of a commodity used for fixed capital falls, it is certain that more of it would be purchased, but, as we have seen (pp. 46, 47), the amount spent on it might increase or might decrease, according to whether the curve of the marginal rate of net profits of the firms in the industry, using the commodity as fixed capital, falls slowly or steeply, as the fixed capital used increases. In the first case a fall in the price would stimulate, and in the second place discourage, Investment in Fixed Capital.

If the prices of all consumption goods fall by the same proportion, this will almost certainly cause a decrease in Expenditure, as we have seen in Chapter VI, p. 58. But it is by no means certain that every fall in the price of consumption goods will lead to a decrease in Expenditure. If there is a fall in the price of certain consumption goods, the demand for which is inelastic, this will certainly lead to a decrease in Expenditure and an increase in

Savings. If, however, the price of those consumption goods falls, for which the demand is elastic, this may lead to an increase in Expenditure and a decrease in Savings. For a change in the relation between the prices of those consumption goods for which the demand is inelastic and of those for which the demand is elastic may cause a change in the relative attractiveness of spending and saving, as much as a change in the rate of interest or in the general price level of consumption goods will cause a change in the attractiveness of spending or saving income. Thus if the price of those consumption goods, for which the demand is inelastic, rose, and the price of those consumption goods, for which the demand is elastic, so fell, that the same absolute amount of money was needed to purchase the same "bundle" of consumption goods as was purchased before the change, the price level of consumption goods, weighted according to the amounts purchased before the change, would remain unaltered and Real Income would remain unaltered. Yet it is clear that the change might increase the attractiveness of spending income relative to the attractiveness of saving.¹ A fall in the price of durable consumption commodities,² such as motor-cars, wireless sets, gramophones, furniture, refrigerators, etc., is still more likely to lead to an increase in Expenditure, if the demand for them is elastic,

¹ I used to believe that this conclusion followed necessarily from simple "utility" assumptions. I was cured of this folly by Mr. W. M. Allen, who would, however, admit, I think, that this is a possible result of such a change.

² I define these goods as consumption goods rather than capital goods, and money spent on them as Expenditure rather than Investment. The definition is, however, simply a matter of personal preference.

than a fall in the price of those non-durable consumption goods for which the demand is elastic; for Expenditure on these commodities is also a form of personal saving.

A raw material may be used to produce fixed-capital goods or consumption goods. A fall in the price of a raw material will lead to an increase (or decrease) in Investment in fixed capital or in Expenditure, if a fall in the price of the commodities, in the production of which it is used, leads to an increase (or decrease) in Investment in fixed capital or in Expenditure. The increase (or decrease) in Investment in fixed capital or in Expenditure will be the greater, the greater (or less) is the elasticity of demand for the fixed-capital goods or consumption goods in question and the greater is the proportion of the prime costs of those goods which is formed by the cost of the raw material in question. Over the period of time which elapses between the purchase of the raw materials, and the completion and sale of the fixed-capital goods or consumption goods in which they are embodied, a fall in the price of raw materials may lead to an increase (or decrease) in Investment in working capital. The fall in the price of a raw material is more likely to lead to an increased Investment in working capital, (1) the more elastic is the demand for the finished product, to produce which the raw material is used, and (2) the greater the proportion of the prime costs of the finished product which goes to the purchase of the raw material.

But a decreased Investment in working capital over this period is compatible with an increase in Investment in fixed capital or in Expenditure,

caused by the fall in the price of the finished product, if the cost of the raw materials constitutes a small enough proportion of the prime costs of the finished product. If a fall in the price of the finished product would lead to a decrease in Investment in fixed capital or in Expenditure, then a fall in the price of the raw materials used is bound to cause a fall in Investment in working capital, unless the fall in the price of working capital leads to great advantages in using a greater proportion of working capital to a given rate of output.

We have seen, then, (i) that any invention, before it has any direct effect upon the prices of the commodity, in the production of which it is used, is likely to lead to an increase in Investment in order to alter the form of the fixed capital used, and (ii) that, after the alteration in the form of the fixed capital employed, it will cause a fall in the price of these commodities, and that this fall in price may cause an increase or a decrease in the incentive for Investment and Expenditure.¹ Thus, when an invention is made and applied, there will probably be a period in which the incentive to Investment will be great and the rate of interest must rise considerably to maintain equilibrium. At the end of this period, when a great part of the new capital

¹ Some time is almost bound to elapse between a fall of price of consumption goods or of fixed-capital goods and the consequent increase in the amount of them purchased, since standards of expenditure are largely conventional and are unlikely to be altered considerably, until consumers discover that they are piling up money balances, while plans to increase real investment in capital need time to develop. Thus a fall in price is likely to cause for some time at least a decrease in Expenditure or Investment, and such a change will, unless immediately corrected by a fall in the rate of interest, cause disequilibrium.

is installed, two things will happen more or less at the same time: (i) the great incentive to Investment will cease, because the new capital is put in, and (ii) the prime costs of the goods produced with the new capital will fall considerably. If a fall in the price of these goods stimulates Investment or Expenditure, the fall in the rate of interest at this point may not have to be very great to preserve equilibrium. But if a fall in these prices itself causes a further decrease in the incentive to Investment or Expenditure, the fall in the rate of interest might have to be very considerable indeed in order to preserve equilibrium.

(2) A second cause of discontinuity in Investment and Expenditure is closely connected with the length of life of fixed capital goods and durable consumption goods. If most people have bought certain durable consumption goods at the same time—either because these goods were invented, came into fashion, or were reduced in price owing to some invention at a particular time, or because there was at some time a boom and loss of equilibrium which caused a great increase in the purchase of such goods—then the demand for those goods will be satisfied in everyone's case at much the same time, and the market for them will be “glutted” for a period of time equal to the length of life of these commodities. There will be a rather sudden decrease in the inducement to Expenditure, followed after a period of time, equal to the length of life of these commodities, by a sudden increase in the inducement to Expenditure, when they all need to be replaced. Similarly in the case of fixed-

capital goods, if a great deal of fixed capital was installed at the same time,—either because an invention, which needed the instalment of a large amount of new fixed capital, was applied at a particular time, or because equilibrium was not maintained and a large amount of fixed capital of every kind had been installed during a boom, or because during a war no fixed capital was replaced, so that a very great deal was replaced at the same time at the cessation of hostilities,—there is likely to be a period of time in which the replacement cost of previous periods' depreciation is a minimum and the allowance for non-replaceable depreciation is a maximum. But at the end of this period, equal to the length of life of fixed-capital goods, there will be a sudden increase in the replacement cost of previous periods' depreciation and a sudden decrease in the allowance for non-replaceable depreciation, which will cause a sudden increase in the incentive to Invest at the current rate of interest for a period of time equal to the time which it takes to construct and install fixed-capital goods.

(3) The third class of causes which may lead to sudden changes in Investment is connected with the changes which may occur in the incentive to Investment because of the absolute increase in output. It is not my purpose here to discuss the whole theory of Increasing Returns, but only to suggest certain ways in which the increase in output may cause changes in the incentive to Investment. As capital accumulates, even if the population is constant, there will be an absolute increase in output; the increase in output will make profitable

new methods of production which were already known or "invented", but which were not profitable before at the current rate of interest, because the total output was too small. The introduction of these processes will take the form of the growth of new industries, to produce by a new method finished commodities or raw materials which were not in great enough demand before to make such processes profitable. They will probably lead to "vertical disintegration";¹ that is to say, some process of production, which was being undertaken separately by every firm in an industry, will be undertaken by a new industry—at first by a new single-firm industry—as soon as the total output of the commodity makes it worth while installing one unit of fixed capital to undertake the new method of production. Such a reorganisation of the industry will essentially, at first at any rate, be monopolistic, since, if there is perfect competition before the change, the new method of production will be introduced as soon as the total output of the industry in question makes it profitable to introduce one example of the new method of production.

Such a reorganisation of industry may well lead to discontinuities in the incentive to investment, and so to sudden and violent changes in the equilibrium rate of interest. In the first place this will be the case if there is already an absence of perfect competition, due to a large element of buyers' preference. Let us suppose that there is a many-firm industry producing a commodity, but that the

¹ See E. A. G. Robinson, *The Structure of Competitive Industry*, p. 26.

consumer, through lack of knowledge, of initiative, etc., does not always buy from that firm which is selling at the lowest price. In this case each individual firm will be faced with a partial demand curve. Now the total output of the commodity may grow to a point at which it would be cheapest to concentrate the total output on one new firm, employing a new process of production which would only be profitable if the whole of the output were concentrated on it. In conditions in which there was no buyers' preference, one such firm would be set up and would undercut its competitors. But where there is a large degree of buyers' preference, this will not occur, since a new firm would have a large cost to meet for invading its competitors' markets. In this case a reorganisation will probably take place after many of the existing producers have realised that, by pooling their resources and "rationalising" their industry, they can greatly diminish their costs and increase their profits without raising their prices. The new process will not be introduced gradually as the output grows—first one example of the new process, when the output of the industry has grown sufficiently to make one example profitable, and then another, when the output has increased still more, so as to make a second example of the new process profitable; the new process will not be introduced at first, but only when the output has grown very considerably beyond the point at which one example of the new process first became profitable. There will follow an agreement among producers to pool their resources and to "rationalise" the industry, and to plan the expenditure of a very considerable

amount of money on Investment for the purposes of the large reorganisation.

But in the second place the reactions of the reorganisation of one industry upon the costs in other industries may cause further discontinuities in Investment. Thus, suppose that there are several industries, A, B, C, D, etc., producing finished commodities, and that there is a process "a", common to industries A and B and undertaken by every firm in A and B independently, and a process "b", common to industries B and C and undertaken by every firm in B and C independently. The growth of the output of industry A may make it profitable to set up a specialised new plant to undertake process "a", and industry A may be reorganised for this purpose. But this will lower the costs of the common process "a" for industry B. The output of B may be so increased that the process "b" is undertaken by a new separate plant, and this will in turn affect industry C. In other words, the reorganisation of one industry may, by reacting on the costs of another industry, increase the motives for reorganisation and the installation of new forms of capital in that other industry. For this reason many industries may be reorganised at much the same time, and there would be in this case a simultaneous increase in the amount of Investment undertaken for "rationalisation" purposes in many industries.¹

¹ In this case the equilibrium rate of interest would have to rise sharply for a time at least, while the form of the capital in existence was being altered. It might also, as Mr. W. M. Allen has pointed out to me, be permanently raised; for the absolute increase in output caused by an increase in the supply of capital may make new processes profitable which were not profitable

It has so far been tacitly assumed that, as soon as it becomes profitable for anyone to undertake Investment in new capital, that Investment will immediately be undertaken. This is of course by no means true. Let us suppose that Investment falls suddenly for one of the reasons which we have examined, *e.g.* because the new fixed capital required to employ a new invention has been installed. Then the rate of interest must fall, until it has given an incentive to undertake a sufficient amount of Investment in new fields. Now it may be that a relatively small fall in the rate would open up sufficiently large fields for Investment to maintain equilibrium; but the increase in Investment in these fields will not necessarily be immediate. For the entrepreneurs, who are on the watch for new ways of making profits, must be given time to find these new ways, and, having found them, to lay their plans before they will spend money on the new Investment. Or again, the fall in the rate may open up a large field of new Investment in the form of setting up specialised plants in existing industries to undertake certain processes by new

before. Once the output has increased sufficiently to make these processes profitable, the demand for capital for these new processes may be very great, if they are such as to require a great deal of capital. If they also remain profitable so long as the increase in output is maintained, even although the rate of interest rises considerably, the rate of interest might be raised permanently by their introduction. The new process would be very much more capitalistic than before, while the other processes would use more labour and less capital. In other words, if there are economies of production of this kind due to an absolute increase in output, and if these economies are such as to make capital a more important factor than before, the marginal productivity of capital and so the rate of interest may rise, as the supply of capital increases, while the supply of the other factors remains unchanged.

and specialised capitalistic methods, which have been made profitable by the fall in the rate of interest. If, however, the market is not perfect, these methods may not be introduced until enough time has elapsed for the competing producers, at the urge of their pockets or their government, to agree to combined reorganisation of the industry. But unfortunately, unless the increase in Investment is immediate, the trouble will be done; disequilibrium will mean a fall in general prices and in incomes and a slump.

Thus in the case in which there is a sudden decrease in Investment, *for a short time* the rate of interest might have to fall very low indeed to preserve equilibrium, until much Investment was taking place that could be undertaken at once but only at a ridiculously low rate of interest. In this case, however, as soon as Investment in the more profitable fields increased again, the rate would have to rise and remain for an indefinitely long period of time above its lowest point, so that a great deal of Investment would have been undertaken in forms of capital which would never be profitable, and the factors of production would to some extent have been maldistributed during the period of very low interest rates. Thus, if the interest rate falls sufficiently to maintain equilibrium, factors will be maldistributed; if, on the other hand, it does not fall, the consequence will be a general slump. The only solution would seem to be the undertaking by the State of expenditure on capital developments, plans for which were always in readiness in case of emergency, while a sufficient fall in the rate of interest was allowed to

induce entrepreneurs to start as quickly as possible with their plans for new Investment. Or alternatively, a national appeal to spend and not to save during this critical period might have the desired effect. But these considerations lie outside the limits within which this enquiry is confined.

(4) The Public Authorities may make decisions, for political or other reasons, which cause a discontinuity in Expenditure or Investment. Such changes will also lead to a change in the Equilibrium rate of interest. Thus there is a large amount of Investment undertaken by Public Authorities which may to a large extent be independent of prices and the market rate of interest, as it is not undertaken for a money profit. Changes in such Investment may take place suddenly because of a change in the policy of Public Authorities. A change in the taxation policy of the Public Authorities may equally well cause changes in Expenditure or Investment. Thus the same amount of taxes may be levied in ways which are more or less discouraging to private Investment; indirect taxes, which raise the price of commodities, may increase Expenditure considerably; different forms of direct taxation may discourage Expenditure to different degrees. The decision of Public Authorities to finance their expenditure by taxation or by borrowing will affect private Expenditure in different ways. Decisions to alter the objects on which Public money is spent, may directly change Investment and Expenditure, or may indirectly change Expenditure by redistributing Individuals' Incomes. All those considerations are important and

open up an interesting range of problems in the relation between Public Finance and Monetary Theory, but to treat them in any detail would go beyond the limits of this book.

(5) All the four types of cause of change in dynamic equilibrium which have so far been discussed, involve an alteration in the amount of Investment or Expenditure at the current market rate of interest. That is to say, any of these changes may cause disequilibrium if the rate of interest does not change appropriately. In this case the primary cause of disequilibrium is non-monetary. But there may equally well be discontinuities in Investment and Expenditure caused by a change in the market rate of interest in conditions in which there has been no change in the Equilibrium Rate. Such discontinuities are a purely monetary phenomenon, and in this case, if there is such a change, *ex hypothesi* equilibrium cannot be maintained. For if the rate had remained constant, Expenditure and Investment would have remained constant; if the rate falls (or rises) for monetary reasons both Expenditure and Investment will increase (or decrease). Whether purely monetary causes are more important than non-monetary causes of disequilibrium it is unnecessary to decide; and the discussion of monetary causes of disequilibrium lies outside the scope of this book, though some reference is made to this point in the next chapter.

X

EXPENDITURE, INVESTMENT AND THE AMOUNT OF MONEY

IN this final chapter I wish to discuss in brief what the Banking System must do in order to maintain equilibrium. This problem is so closely related to monetary problems of disequilibrium, which I wish to avoid in this book, that the discussion is bound to be very incomplete.

In the first place, let us discuss how the Banks can maintain equilibrium in face of conditions in which disequilibrium is likely to be caused for the purely monetary reason mentioned under (5) of the last chapter. In this case no one has made any decision to change Investment or Expenditure at the current rate of interest; but this does not mean to say that it will not be the duty of the Banking System to change the amount of money in order to maintain equilibrium. Equilibrium will in this case be maintained if the rate of interest remains unchanged. The long-term market rate of interest is determined by the price of fixed-interest shares on the Stock Exchange Market; the price of ordinary industrial shares will, as we have seen, be determined by the rate of interest, *i.e.* the yield on fixed-interest stock, and by the expectation of the market as to the future course of profits. If there is no change in the expectation of the market of future profits of industry, then the prices of both

fixed-interest and ordinary shares will vary in the same proportion in the same direction, and such variations will be equivalent to a variation in the rate of interest in the opposite direction. If the rate of interest remains constant but the expectation of future profits falls, then the price of ordinary shares will fall and this will discourage Investment. In the case which we are investigating, however, there is no change in the incentive to Invest or Spend at the current rate of interest, but the market rate of interest itself alters. The long-term rate of interest is determined,—given the expectation of future profits, so that the prices of all securities will vary in the same proportion in the same direction,—by the flow of money on to the security market and by the flow of securities on to the market. The rate of interest will rise (or fall) if the flow of money on to the market decreases (or increases) or if the flow of securities on to the market increases (or decreases). In the case in which there is no autonomous decision to alter Investment or Expenditure, the flow of funds coming on to the security market cannot change because people have decided to spend less or more on consumption goods, and the flow of securities cannot alter because people have decided to borrow more or less for Investment purposes.¹ The flow of funds or of securities coming on to the market can only alter

¹ More accurately the flow of securities cannot alter because people have decided to Invest more or less at that moment. People may sell more securities in order to hold money instead, because they intend to Invest more *at some future date*; but this is a case of an increase in the public's "bearishness". The public are at the moment simply exchanging securities for money (cf. Chapter II, Note I, p. 22).

because people decide to hold more or less of their wealth in the form of money or securities, or else because the Banking System buys or sells securities in the open market. Persons or institutions become more "bullish", if they decide to hold more of their wealth in the form of securities and less in the form of money, and they may do this either by selling fewer or by buying more securities than before in order to hold securities instead of money; inversely, if they decide to buy fewer or sell more securities in order to hold money instead of securities, they become more "bearish". If persons become more "bullish", the price of securities will rise and the rate of interest fall, unless the Banking System sells securities, *i.e.* decreases the amount of money, at the same rate at which the public have decided to increase their purchases or decrease their sale of securities; similarly when the public becomes "bearish", in order to maintain the rate of interest constant and so, in the case we are examining, to maintain equilibrium, the Banking System must increase its purchase of securities and so increase the amount of money at the same rate at which the public have decided to increase their sales or decrease their purchase of securities.¹

¹ How much the Banking System has to alter the amount of money in order to maintain the long-term rate of interest constant will depend upon (*a*) how much the banks alter the deposit rate, and (*b*) how far the banks are willing to operate directly on the long-term rate by buying and selling long-term securities. Moreover, the type of policy which the Banking System adopts to maintain equilibrium, will determine the relation between the different rates of interest, which may be different in the new equilibrium; and if Investment is at all sensitive to changes in the short-term rates of interest, the long-term rate may not be exactly the same, if equilibrium is maintained by operating on the bill rate. For a

In the second place it is necessary to decide in what conditions, if there is a primary change in the decision to Invest or to Spend at the current rate of interest, the Banking System must operate on the market rate of interest in order to make it coincide with the new Equilibrium Rate, and in what conditions the Market Rate will automatically alter so as to coincide with the Equilibrium Rate. Now we may say at once that an increase (or decrease) in Expenditure will have no immediate effect upon the Market Rate of Interest, if the increase (or decrease) in Expenditure is accompanied by a decision on the part of the persons increasing (or decreasing) their Expenditure to finance this increase (or decrease) by increasing (or decreasing) the rate at which they are decumulating their holding of money, or by decreasing (or increasing) the rate at which they are accumulating money balances. For in this case the increase (or decrease) in Expenditure will not decrease (or increase) the flow of money on to the security market, and will not therefore raise (or lower) the rate of interest. To maintain equilibrium, the Banking System must sell (or purchase) securities to raise (or lower) the rate of interest. Similarly an increase (or decrease) in Investment will have no immediate automatic effect upon the market rate of interest, if the increase (or decrease) in Investment is accompanied by a decision on the part of the persons increasing (or decreasing) Investment to finance this increase (or decrease) by increasing (or de-

discussion of these problems the reader is referred to Chapter III, the arguments of which chapter should be borne in mind throughout this chapter.

ing) the rate at which they are decumulating, or by decreasing (or increasing) the rate at which they are accumulating money balances. For in this case the increase (or decrease) in Investment will not increase (or decrease) the flow of securities on to the market and will not therefore raise (or lower) the rate of interest. Again, to maintain equilibrium and to raise (or lower) the rate of interest, the Banking System must sell (or purchase) securities.

But suppose that people decide to decrease (or increase) Expenditure, but decide at the same time to increase (or decrease) the amount which they spend on securities by exactly the same amount and exactly at the same moment as they decrease (or increase) Expenditure. Will the increased (or decreased) flow of money on to the security market raise (or lower) the price of securities, i.e. lower (or raise) the rate of interest, just sufficiently to increase (or decrease) Investment to preserve equilibrium? Or suppose that persons decide to Invest more (or less), but decide to borrow more (or less) by selling at exactly the same time exactly so many more (or less) securities on the security market. Will the increased (or decreased) flow of new securities on to the market raise (or lower) the rate of interest just sufficiently to discourage (or encourage) Expenditure and Investment in other directions, so that equilibrium is preserved?¹

¹ Mr. Keynes would answer both these questions in the negative. Mr. Keynes' equations in the *Treatise on Money* tell us that an increase in Savings, for instance, will be accompanied by an exactly equivalent increase in Losses, which must be financed by the Savings, if Investment does not increase. But this in itself does not answer the question, since, if an

In order to answer these questions satisfactorily something must be said of the nature of the security market. In the first place it has already been stated that the yield on fixed-interest securities will measure the long-term market rate of interest, and that the price of ordinary shares will be determined by the expected dividend yield capitalised at the current market rate of interest,—allowing, of course, for the different degrees of risk entailed. But certain relations must also be preserved between the price of newly issued and existing securities. The yield on newly issued fixed-interest securities must be the same as on that of existing securities, and newly issued ordinary shares must also be priced at the capitalised value of the profits expected from them at the current market rate. It is the function of an efficient security market to preserve these relations between fixed-interest and variable dividend securities and between newly issued and existing securities.

In the second place, it is always possible for persons to hold their wealth in the form of money or in the form of securities, and an efficient security market will make it possible to sell securities for money and to buy securities with money with a

increase in Savings causes an increase in Investment, there will be no Losses to finance. Mr. Keynes, however, argues that there are two factors at work, the "excess-bearish" factor and the "excess-savings" factor, and a decision to save more, even if the savers do not also become more bearish than before, will not cause an equivalent increase in Investment. Mr. Keynes' argument depends upon his analysis of the forces at work on the Stock Exchange, and it is only by means of an analysis of that kind that the two questions in the text of this book can be answered. The rest of this chapter is to a large extent simply a reproduction of arguments of Mr. Robertson and Mr. Keynes in the *Economic Journal* of September 1931.

minimum of expense. There are two main factors which will determine how much of their wealth people wish to hold in money and how much in the form of securities, which are important for our purposes. First, the lower is the yield on money (the deposit rate) and the higher is the yield on securities (the bill rate or the long-term rate of interest), the smaller is the proportion of their wealth which persons will wish to keep in the form of money. Secondly, people will hold more money and less securities (or less money and more securities) irrespective of the relative yields on money and securities, if they think that securities are overvalued and are likely to fall in price (or if they think that securities are undervalued and are likely to rise in price). The following factors will therefore induce people to hold more (or less) money and less (or more) securities: (1) a rise (or fall) in the deposit rate, (2) a fall (or rise) in the yield on securities, (3) the belief that the rate of interest is going to be higher (or lower) in the future, since this would cause an expectation that the price of securities was going to fall (or rise), (4) the belief that profits are going to be smaller (or larger), since this would cause an expectation that the price of ordinary shares would fall (or rise), and (5) a rise (or fall) in the price of securities, if neither of the conditions mentioned in (3) and (4) is present, since persons would then consider that security prices would again fall (or rise) and are at the moment overvalued (or undervalued). That is to say, at any moment of time, if there is a price of securities quoted on the security market, it must be true that, if the price of securities had been lower, a

certain number of persons would have bought securities with a certain part of their money holdings, both because the yield on securities would have been greater, and also because they would have considered that securities were undervalued and would rise in price. Conversely, it must be true that if the price of securities had been somewhat higher, some persons would have sold a certain amount of their securities to hold money instead.

Now in the case in which there is a decrease (or increase) in Expenditure, and those persons who decide to spend less (or more) on consumption goods decide also to spend exactly as much more (or less) on securities at exactly the same time, there will be an equivalent increase (or decrease) in Investment, if the increase (or decrease) in the money spent on securities is not offset by an increased (or decreased) sale of existing securities. The increased (or decreased) amount of money being spent on securities will raise (or lower) the price of securities; but all securities, new and old, must move together. Now there is no reason why a decrease (or increase) in Expenditure should *instantaneously* alter the expectations of the market as to the profitability of industry, nor the expectation of the market as to the future course of the rate of interest; such expectations will only be altered as soon as the effects of the alteration have had time to make themselves felt and to be observed. But the rise (or fall) in the price of securities will therefore lead some persons to sell securities for money (or to buy securities with their money holdings), because the yield on securities is lower (or higher) and also because it is thought that

securities are now overvalued (or undervalued). It follows then that some of the increased (or decreased) flow of money on to the security market will not automatically mean an increase (or decrease) in expenditure on new issues and so in Investment, but will be offset to some extent by an increased sale (or purchase) of securities by "speculators". Similarly, if there is an increase (or decrease) in Investment, which is financed by a simultaneous and equivalent increase (or decrease) in the amount of new securities issued, the increase (or decrease) in the flow of new securities on to the market will lower (or raise) the price of securities. This will cause some persons to buy securities, because their yield is higher and because they are considered undervalued (or to sell existing securities, because their yield is lower and because they are considered overvalued). In this way some of the funds which go to finance the new Investment need not be withdrawn from Expenditure or from other forms of Investment, but will come from "bull" speculators; and some of the funds which were going to finance Investment of a certain sort, will not automatically go to finance other Investment or Expenditure in the event of a decrease in Investment, but will go to finance the sales of "bear" speculators.

It is not my intention in this book to follow up the process of disequilibrium: if a decrease in Expenditure does not immediately cause an increase in Investment, a slump will start; and if an increase in Expenditure does not cause a simultaneous and equivalent decrease in Investment, a boom will start. Similarly, if an increase (or decrease) in In-

vestment does not cause a simultaneous and equivalent decrease (or increase) in Investment in other directions or in Expenditure, a boom (or slump) will start. What I have attempted to show in the last few paragraphs is the reasons why the decision to Invest and the decision not to Spend are independent of one another, even if those who decide to Invest or to Spend more (or less) do not also decide themselves to dishoard (or to hoard)¹ more money. The analysis depends upon the nature of the Stock Exchange, which is described by Mr. Keynes in the *Treatise on Money*. If this analysis is correct, it follows that, if persons decide to Spend or Invest less (or more) at the current rate of interest, the Banking System, to preserve equilibrium, must increase (or decrease) the amount of money in order to lower (or raise) the rate of interest sufficiently; this must be done, even if those who decide to Spend or Invest less (or more) do not themselves decide also to hoard (or dishoard), though the Banking System need, of course, act to a smaller degree in this case. It is therefore quite correct to say in this sense that there is an "excess-savings" factor as well as an "excess-bearish" factor.²

¹ I am using the terms "hoard" and "dishoard" in the sense in which Mr. Robertson uses them in *Banking Policy and the Price Level*.

² This does not, of course, mean that "bull" speculators, who buy securities because their price has fallen, do not "dishoard", and "bear" speculators, who sell securities because their price has risen, do not "hoard", in Mr. Robertson's sense of those words. But, as Mr. Keynes has defined the term, their bearishness or bullishness has remained unchanged, if they only sell or buy because the price of securities has risen or fallen.

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